



Digitized by the Internet Archive
in 2016

JOURNAL

OF THE

ASIATIC SOCIETY.

No. IV. 1861.

Decipherment of an Inscription from Chedi, with a brief Statement of the Historical and other Indications therefrom derived. By FITZ-EDWARD HALL, ESQ., D. C. L.

Alike by way of confirmation, and on other grounds, the present inscription possesses interest.

Some years ago, in giving an account of two similar relics, discovered near Jubulpore, I was at some trouble to deduce, that the circumjacenties of that place were included, of old, in the kingdom of Chedi.* For deduction, on this point, I am now prepared to substitute affirmation.†

Further, the Kokalla of Chedi, mentioned in several inscriptions found in the west, I formerly hesitated, for want of complete evidence, to identify with the Kokalla of Chedi of whom I was then writing. Here, also, fresh data enable me, as will be seen, almost to assert that which before was but impliedly suggested.

* See the *Journal of the American Oriental Society*, Vol. VI., pp. 499—536. The reader of this paper should have those pages before him.

Possibly we have Chedi in the “Tehi-ki-t’o” of Hiouen-Tsang, which M. Julien hesitatingly represents by “Tchikdha,” but positively deems to be one with Chitor. Hiouen Tsang reached “Tehi-ki-t’o” after travelling about a thousand *lis* N. E. from Ujjayini. The error of the Sinologer begins with taking west for east. Subsequently he adopts the conclusion of M. L. Vivien de Saint-Martin, who, following Sir Henry Elliot, traces “Tehi-ki-t’o” to Jajhátí, on the river Ken. See *Voyages des Pèlerins Bouddhistes*, Vol. III., pp. 168, 408, 442; and *Biographical Index to the Historians of Muhammedan India*, Vol. I., p. 37, second foot-note.

† Lakshmana, a Kulachuri chieftain, is, in the inscription now printed, twice called Lord of Chedi; namely, in the fifty-sixth and fifty-ninth stanzas.

When previously treating of the mediæval rulers of Chedi, I gave their names as follows :

Yuvarāja.*
Kokalla.†
Gāngeya.
Karna.
Yas'ahkarna.
Gayakarna.
Narasinha.
Jayasinha.
Vijayasinha.
Ajayasinha.

Each of these persons, with one reservation, was son of his immediate predecessor. Jayasinha was brother of Narasinha. Ajayasinha is heard of only as heir apparent.

The names of kings,‡ the first of the list excepted, drawn from the inscription appended to these remarks, are :

Lakshmana.
Kokalla.
Mugdhatunga.
Keyúavarsha.
Lakshmana.§
S'ankaragana.
Yuvarāja.

In this series, as in the preceding, the succession passed from father to son ; only Yuvarāja was S'ankaragana's younger brother.||

We here have introduced to us a new line, descended from Kokalla, that bore sway in Chedi ; the other line being that which proceeded

* The name of the person so titularly styled was Lakshmana, as we know from Colonel Wilford. See the *Asiatic Researches*, Vol. IX., p. 108.

That Kokalla's father was Yuvarāja appears from a grant on copper. See this *Journal*, for 1839, p. 489, seventh and eighth stanzas.

† His name is also seen spelled Kakkala and Kakkalla. Where the first occurs, only a single *l* would quadrate with the metre. The doubling of the *k* is of no prosodial significance, and probably is a miscript in both places. See the *Journal of the Bombay Branch of the Royal Asiatic Society*, Vol. IV., first facsimile facing p. 110.

‡ See stanzas 12, 18, 24, 46, 64, 67.

§ He was familiarly known, we are told, as Yuvarāja. The reason must have been, that he was for a long time heir apparent. See the forty-sixth stanza.

|| So it is stated in the sixty-seventh stanza.

through Gángeya.* Whether he was elder son, or whether Mugdhatunga was, is not ascertained. However this may have been, it is tolerably clear, that, immediately after the time of Kokalla, Chedi underwent partition.

Kokalla's grandson's grandson, Gayakarna, married a granddaughter of Udayáditya, sovereign of Dhárá; and the Kṛishnarāja whom Kokalla is said to have defeated in the south,† was, not impossibly, that lady's ancestor.‡ Again, the Bhoja whom he is recorded to have vanquished in the west,§ was, without much question, one of the two kings of Kanauj who bore that appellation. These kings will be spoken of in my next paper.

Of Mugdhatunga's exploits we learn nothing, further than that he wrested Pálí from the lord of Kosala.||

Keyúrarvarsha wedded a lady, Nohalá by name, of whose family a few particulars are specified. Her father was Avanivarman, son of Sadhanwan, son of Sinhavarman. Their clan was the Chaulukya. The Chaulukyas, it is related, arose in this wise.¶ Drona, son of

* Other issue of Kokalla were S'ankaragaṇa, Arjuna, and Mahádeví. S'adruka was, possibly, still another child of his; but I am disposed to suspect, that S'adruka, if not a misdecipherment, was the proper name of S'ankaragaṇa, called Ranavigraha also.

Mahádeví married a chieftain named Kṛishṇa, or Akálavarsha. Fruit of this union was Jagadrudra, or Jagattunga, who had for wives his two cousins german, Lakshmi and Govindámbá, daughters of S'ankaragaṇa. The rest that I heretofore wrote of the domestic history of Jagadrudra was based on misapprehension. Indra, son by Lakshmi, married Dwijámbá, granddaughter of Arjuna, his grand-uncle through both parents.

† See the seventeenth stanza.

‡ *Vide* p. 197, *supra*.

§ See the seventeenth stanza.

|| See the twenty-third stanza. Kosala—since there is no good ground for the ordinary spelling, Kos'ala—was once, to all appearance, a most extensive kingdom. But time and change seem to have abridged, by little and little, its ancient limits, until it became restricted, for centuries before its extinction, to the vicinity of some point of the Vindhya mountains. On the authority of an unpublished inscription, Kosala at one time answered, with more or less of exactness, to the modern Chhattisgarh. It was, undoubtedly, the Pálí of that principality, which Mugdhatunga is said to have snatched from its master. See the *Asiatic Researches*, Vol. XV., p. 504.

The late Professor Wilson, in his Translation of the *Vishṇu-purāṇa*, pp. 478, 479, has written: "There will be nine kings in the seven Kos'alas." The original of this is: सप्तकोसलायां तु नवैव भूयतयो सविद्यन्ति. Only in the Paurāṇika nomenclature do we encounter this "tract embracing the seven Kosalas;" to render the Sanskrit more strictly. What was meant by it remains to be settled.

¶ Other accounts of their origination are met with; particularly in the inscriptions published by Mr. Wathen. What follows is from the pen of Mr. Walter Elliot:

Bharadwāja, becoming, on one occasion, incensed at Drupada, took water in his hand,* in act to curse him. Some of it fell to the ground; and from it the Chaulukyas derived their origin.†

Queen Nohalā erected a temple to S'iva, and gave it in charge to Is'waras'iva, disciple of S'abdas'iva, who came after Pavanas'iva, son of Madhumati. On Is'waras'iva she bestowed two villages, Nipániyā and Vipātaka; and she likewise set apart, for the behoof of the temple, Dhangāṭa, Pātaka, Poṇḍī, Nágabalā, Khailapātaka, Vídā, Sajjākalī, and Goshthapālī.‡

Lakshmaṇa was son of Keyúraravasha, by Nohalā. Like his grand-sire, Lakhsmaṇa waged hostilities against Kosala, and overcame its chief; if the words of an Indian eulogist may be taken literally. Odra, or Orissa, he is also reported to have invaded, and to have despoiled its king of an effigy of Káliya,§ wrought in gold and precious stones. This effigy he consecrated to S'iva, at the famous temple of Somes'wara, or Somanátha, in Gujerat, where he had before dedicated a car.||

Nohalā's temple, from which doubtless our inscription came, is again spoken of, with its incumbents, and their spiritual precessors.

"In one of the inscriptions, the origin of the family is deduced from 'Brahm, Manusputra (or Atri), Mandavi or Mandavya, Hariti, Háriti Pancha Sikha, who was making a libation to the sun, at the Śrī Saundhya, when the Chalukyas sprang from the spray of the water poured out. In this race were born Vishnu Verddhana, Vijayaditya, and Satya Sri, lord of Ayodya, &c.'

"In another, the descent is brought from Bralima, through Budha and Ila, to Paruravas, 'from whom came Hariti the fire-tufted, making illustrious the Somavansa, and progenitor of many royal races, conspicuous among which was the Chalukya vansa, in which was born Satya Sri, the lord of Ayodhya, from whom the race was denominated the Satya Sri Kula.'" *Journal of the Royal Asiatic Society*, Vol. IV., p. 8, foot-note.

This extract abounds with errors. I have not undertaken to set them right.

* Chaulukya is here referred to *chuluka*, a word incorrectly defined, as to one of its senses, by Professor Wilson, "the haud hollowed to hold water." It means a handful of water.

If Chaulukya be the right word, it is often found misspelt.

Chullú denotes, in Hindí, what Professor Wilson understood by *chuluka*. But *chungal* is not, as has been asserted, "a handful of anything dry, as *chullú* is of anything liquid." It means as much as can be grasped between the contracted fingers and thumb. See Sir H. M. Elliot's *Supplemental Glossary*, Vol. I., pp. 143, 144.

† See from the thirtieth stanza to the thirty-eighth, both inclusive.

‡ See stanzas 40—45.

§ Káliya or Káliya is the name of a huge serpent which Krishna, the divinity, is reputed to have subdued. It is the custom to make fancied representations, in miniature, of this monster, and to hang them about the neck of images of S'iva. See the *Bhágavata-purāṇa*, Book X., chapters 16, &c.

|| See stanzas 46 and 59—62.

One Rudras'ambhu was a devotee at Kadambaguhá. Among his disciples was Mattamayúranátha, who was religious guide to a chieftain called Avanti.* A line of holy personages is named, as having followed Mattamayúranátha's successor Dharmaś'ambhu: Sadás'iva, Mádhumateya or Sudháman, Chúdás'iva, and Hṛdayas'iva. The last was in the service of Rájá Lakshmana, who entrusted to him the temple aforesaid. From Hṛdayas'iva it passed into the custody of Sádhuṛinda, disciple of Aghoras'iva.†

S'ankaragana and his younger brother are dismissed, by the inscription-writer, with nine stanzas of vague encomium.‡

Equally in inscriptions from the west, and in the one under abstract, which was discovered not far from the Narmadá, we encounter the very uncommon names of Kokalla and S'ankaragana,§ where the kings of Chedi are in question. There can scarcely, then, any longer be doubt, that it is one and the same royal family which all those memorials have in reference.

The first three kings of our inscription are panegyricized, in it, we are told, by S'rínivása, son of Sthiránanda; and the remaining three, by Sajjana, son of Shíra.|| The compiler and supplementor of their labours seems to have been Rájas'ekhara. If this was the dramatist, a matter of some curiosity, in a literary point of view, now approaches its solution.¶

Towards its conclusion, the inscription is much worn. Something is wholly abraded; and much more is impracticable or confident decipherment. The names of Tripurí, Saubhágypura, Lavaṇanagara,

* His full name was Avantivarman. The meaning of the forty-ninth stanza I could never have made out rightly, but for the aid of another inscription, in which we read of Kadambaguhá, the town of Mattamayúra, and its master as just specified. Avantivarman gave to an unnamed monastic a piece of ground in Mattamayúra; and the monastic, from that time forward, was called Mattamayúranátha,—a title, more properly, of his benefactor. See this Journal for 1847, pp. 1080—1084; and Sir H. M. Elliot's *Biographical Index*, &c., Vol. I., p. 38, fourth foot-note.

† See stanzas 48—58. The pious folk here remembered, most likely enjoyed but a local celebrity. An Aghoras'iva is quoted in the *Sarva-dars'ana-sangraha*, in the chapter on the tenets of the S'aiva sectaries. Sadás'iva is an appellation not at all unusual. Quite probably, Sádhuṛinda is not a proper name.

‡ Stanzas 63—72.

§ See the *Journal of the Royal Asiatic Society*, Vol. III., p. 95, twelfth and fourteenth stanzas; also the *Journal of the Bombay Branch of the Royal Asiatic Society*, Vol. IV., p. 111. At p. 203 of Vol. III., Part II., we read of one Buddharája,—as he should have been called,—son of a S'ankaragana.

|| Perhaps, Dhíra. See stanzas 77, 78.

¶ This topic I shall recur to in my next contribution to these pages.

and Durlabhapura are, however, perfectly legible; and so are those of the transcriber for engraving, Tunái, son of Vira,* and of the engraver, Nonna, son of Sangama, artificer. But the most important loss, by much, is that of the date, which was dynastic.† I hazard the conjecture, that it corresponded to one of the early years of the twelfth century.

The inscription is in thirty-three lines, and covers a surface measuring six feet and five and a half inches by three feet and one inch. Its stone has a raised edge all the way around. At present this stone is at Jubulpore. Some twenty years ago it was carried thither, I am informed, from Bilharí, which lies about fifty miles distant, near the road to Mirzapore. There is a local tradition, that Bilharí bore, in by-gone days, the name of Pushpávati. Its inhabitants still show ruins of one palace attributed to Karna, and of another said to have been built by a Rájá Lakshmana.‡ In the case of Karna, popular memory may, thus, have been faithful for the space of eight hundred years.

Mainly from want of leisure, I have not translated the inscription in detail. Apart from the facts of history which it is the vehicle of imparting, its merits are none at all. Its Sanskrit, almost throughout, is, in a high degree, involved, ungainly, and affected, besides being, not seldom, incorrect. Of its three writers, the first, at least, appears to have been keenly conscious of his awkwardness; for it is only justice to take him at his word. He says: "Though I possess not beauty of language, it will accrue to me from *memorializing* this most worshipful lunar family, of celebrated eminence. Analogously, mark! *albeit* naturally produced of a dark colour, do not, indeed, the streams, exuding in rut from *the temples of* the black elephant, acquire the *lustrous* hue of the milky ocean, when brought into contact therewith?"§ Once more: "Alas! what, forsooth, are we, to delineate, with tasteless babble, the virtues of these *magnates*;

* Called *karanika*, or scribe. He seems to have been son of Siruka, the Káyastha.

† A patent issued by Karna, of Chedi, was dated in the year 2 of his own era, according to Colonel Wiltord. See the *Asiatic Researches*, Vol. IX., p. 108.

‡ Less trustworthy, of course, and yet deserving of a note, are the traditions, that Vikramáditya and Bhartrihari were born at Bilharí, and that the same place witnessed the loves of Mádhavánala and Kámakandalá.

§ Sixth stanza.

when even the adorable goddess of eloquence would, methinks, evidently be confounded by the enterprise!"*

For material aid in connexion with the ensuing pages, I am indebted to an ingenious and most intelligent young pandit, Vishnu S'ástri Áthlye, my constant helper in uncluing the gyptie perplexities which so embarrass the Indian antiquary.†

INSCRIPTION.

ओम् । नमः शिवाय ।

पायाद् वः स समस्तमङ्गलनिधिः शम्भोर्जटाजूटको
यस्मिंस् लोललसद्गुणगुणलन्मन्दाकिनीवारिभिः ।

गाढग्रन्थिनिपीडितोरगपतिप्रस्फारफुल्लत्फणा-‡

भीमव्यावृतवत्क्लमारुतवृतैः श्वेतातपत्रायितम् ॥ १ ॥

अपि च ।

अथाद् वञ्चन्द्रचूडस्य लोचनार्चिघ्नतः शिखा ।

मित्रमेघ स्मरस्येति दग्धं विधुमिवोद्गता ॥ २ ॥

यं खेलाय घडाननः शिशुतया कृत्वा गृहं मार्गति
ग्रन्थो यच्च दुरोदरैः पुरभिदो देव्या समं दीव्यतः ।

केलीकोपकथासु येन तनुते हेतिक्रियां पार्वती

पायाद् वः स जटावनैककुसुमं शर्वः सुधादीधितिः ॥ ३ ॥

दिक्षु प्रेङ्क्षाभियोगप्रवलितवलनाविभ्रमाकाण्डचण्डैर्
दोर्दण्डानां प्रकामप्रथिमभिरनिलैर्दूरमुत्सारितासु ।

किञ्च प्रस्फारचारी नमदवनिवशाद् व्योम्नि याते महत्ताम्

अथादव्याहतेच्छं त्रिपुरविजयिनस्ताण्डवाडम्बरो § वः ॥ ४ ॥

वंशेऽत्र सोमसम्भूतौ वाचं निक्षिपता मया ।

हन्त हस्तैरुपक्रान्ता मोहेन वियतो मतिः ॥ ५ ॥

वाचामुज्ज्वलिमाऽपि नाऽस्ति यदि मे तत् कीर्त्यमानोद्भवेत्

* Tenth stanza.

† There are still at Jubulpore two undeciphered Chedian inscriptions. One of them is less illegible than the other; but both are too nearly worn out ever to be read in their entirety. The later, dated in the year 931 of an unknown era, exhibits the names of King Gayakarna, of S'as'idhara, pandit and poet, and of the engraver Námadeva, son of Mahidhara. Of the earlier, dated in 926, I have made mention in the *Journal of the American Oriental Society*, Vol. VI., p. 533.

‡ The original has -पतिः. Erasure of the *visarga* seemed to be demanded.

§ Corrected from -डम्बरं.

श्यामाशङ्किभिराकुलैर्विजघटे चक्राङ्गयानां द्वयैर्
 अम्भोदागमविभ्रमेण विदधे लास्योत्सवः केकिभिः ।
 भद्रालोकमकाण्ड एव च दृशा मान्द्ये न लेभे पदं
 यत्सेनारजसि क्रमादवनितस्तारापथे लुप्यति ॥ १४ ॥
 वेलावनप्रणयिसैन्यभरे च यत्र
 मज्जद्विराकुलकुलाद्रिनिभैरिभेन्द्रैः ।
 सम्भ्रान्तमन्दरगिरेः समयस्य तस्य
 कालाद् बहोः स्मरणमाप निधिर्जलानाम् ॥ १५ ॥
 यतश्च वैन्यं* तटमाददाने
 दानेद्वसेनागजभञ्जनेन ।
 अमञ्जसिञ्जानशकुन्तचक्रं
 चक्रन्द दुःखादिव दत्तजालम् ॥ १६ ॥
 जित्वा दृष्ट्वां येन पृथ्वीमपूर्वं
 कीर्तिस्तस्माद् बन्धमारोप्यतेऽस्म ।
 कौम्भोद्भूयां दिश्यसौ दृष्ट्वा राजः
 कौबेर्या च श्रीनिधिर्भोजदेवः ॥ १७ ॥
 बभूव तस्मादथ मुग्धतुङ्गस्
 तुङ्गस्त्रिलोक्यामपरो न यस्मात् ।
 दिशश्च यः किञ्च विजेतुकामः
 कामस्तु शत्रुर्न भुवं विलेभे ॥ १८ ॥
 शय्या सङ्ग्रामलक्ष्म्याः परबलपरिघः पल्लवः कोपवह्न्याः
 प्रेयो दर्पस्य मित्रं सुचरितसलिलस्येन्द्रनीलप्रणालः ।
 शाखा शौर्यद्रुमस्य प्रसरणसरणिः शाश्वती साहसानाम्
 आसीद् यस्याऽसिरेवं प्रधानपरिकरारम्भिणः प्रीतिपात्रम् ॥ १९ ॥
 वल्गुदेतालवर्गचुटितनिजशिरोधारिधावत्कबन्धं
 डात्कुर्वड्वाकिडिम्बं मुखविलविलसत्सम्मुखोल्कामुखोल्कम् ।
 मांसग्रासाभिलाषखनदशिवशिवाभैरवाऽऽरावरौद्रं
 रौद्रं यो धाम† बिभ्रत्प्रतिसमरमिति द्वेषिचक्रं चकार ॥ २० ॥
 उपविपिनभुवो निधिर्जलानाम्
 अधिवसता कटकेन यस्य यातुः ।

* What does this word signify?

† A suppliance on conjecture. Two syllables are here quite lost.

अवचयति वलदधूकराय-
 द्विगुणितविद्रुमपल्लवा बभूवुः ॥ २१ ॥
 इह विहितविलासा वीचयो वारिराशेर्
 इह स वसति वायुः केरलीकेलिकारः ।
 इह हरति भुजङ्गी सौरभं भूरुहाणाम्
 इति मलयसमीपे यद्विचाराः प्रचेरुः ॥ २२ ॥
 विजित्य पूर्वाम्बुधिकूलपालीः
 पालीः समादाय च कोसलेन्द्रात् ।
 निरन्तरोद्वासितवैरिधामा
 धामाधिकः खड्गपतिर्य आसीत् ॥ २३ ॥
 गौडीगाढमनोमनोरथकरः कर्णाटकान्ताकुच-
 क्रीडाशैलतटोविहारहरिणो लाटीललाटाङ्कदः ।
 काश्मीरीविहितस्मरव्यतिकरस्तस्मात् कलिङ्गाङ्गना-
 सङ्गानव्यसनी स नीतिनयनः केयूरवर्षोऽभवत् ॥ २४ ॥
 आशापालपराजयाय जनितत्रैलोक्यशङ्कापदं
 सैन्यैर्यस्य सुशान्तकेलिकलनैर्दत्तप्रयागैरपि ।
 न प्रोद्धृतिमवाप पांसुपटलं भूयो गृहीतद्विषद्-
 बन्दीवृन्दवहद्विलोचनपयःपूरस्रुतायां भुवि ॥ २५ ॥
 यः संयति प्रकटपाटितकुम्भिकुम्भ-
 मुक्ताफलप्रचयवाहमुवाहदेवः ।
 भूयो निपीतदृढपीडनवेमवान्त-
 विद्वेषिकीर्तिकणकीर्णमिवाऽसिदण्डम् ॥ २६ ॥
 आकैलासादनलसलसत्पार्वतीकेलिवन्द्योर्
 आ च प्राचः शिखरिवरतो भास्वदुद्भासभूमेः ।
 आरात् सेतोस्तदनुपयसामाप्रतीचोऽपि पत्युर्
 यत्सेनानामहितनिहितानन्ततापः प्रतापः ॥ २७ ॥
 प्रेङ्खत्तिप्रखुरप्रघातविगलक्कीलालोलोलसद्-
 वेतालीकरयन्त्रपीडनवशभ्रश्यत्कपालास्थिभिः ।
 यस्तस्तार सविस्तरं रणभुवः कोपोत्कटाभिद्रवद्-
 दृप्तद्वेषिशिरोभिरम्बरचरीनेत्रत्रिभागार्चितैः ॥ २८ ॥

देवो रुद्रावतारस्त्रिभुवनभुवनोत्तमभनो देव एव
 त्यागी देवः प्रमाद्यन्नपतिनियमने नैगडं दाम देवः ।
 इत्थं सद्गन्दिष्टन्दैरविरलविलसच्चाटुवादं वदद्भिर्
 यस्याऽस्थानस्थितानामसममसुहृदां विव्यथे चित्तवृत्तिः ॥ २६ ॥
 भरद्वाजो नाम च्युतकलुषदोषः समभवत्
 य एकः सर्वेषामुपशमधनानामधिपतिः ।
 तदीयात् तेजस्तः कृतकलशवासाद् यदभवत्
 स वै भारद्वाजस्त्रिभुवनचमत्कारिचरितः ॥ ३० ॥
 त्रैलोक्यावधि यस्य कीर्तिलभितं लक्ष्मीञ्च वाञ्छावधिर
 यत्कोपः प्रलयोपपन्नमहिमा शापेन चापेन च ।
 वर्ण्यं वा नयविक्रमैकजलधेः किं तस्य यस्याऽभवंत्
 लीलाखर्वितशार्वांगवर्ममहिमा शिष्यः सुभद्रापतिः ॥ ३१ ॥
 कोदण्डताण्डवनप्रण्डितबाहुदण्डम्
 उदण्डकाण्डभरखण्डितपाण्डुसैन्यम् ।
 संवीक्ष्य विद्वतविपक्षपराजयाशः
 सत्याद्रितः सतपसोऽपि सुतश्चचाल ॥ ३२ ॥
 अथाऽऽक्षेपात् तेन द्रुपदविपदर्थोद्धतधिया
 यदात्तं शपायान्तरलितकराबद्धचुलुकम् ।
 पुमानाऽऽसीत् तस्मिन् विजय इव साक्षादनु च तं
 कुलं चोलुक्यानामनगुणगुणसीमं प्रवृत्ते ॥ ३३ ॥
 विभवति च *विसर्पच्छैर्यसौन्दर्यवर्य-
 क्षितिधरपरिपाटीस्तुचिते तत्र गोत्रे ।
 रचितचटुलचापाकृष्टिकृष्टाहितश्रीर्
 अभवदवनिवर्मा विश्वविख्यातकर्मा ॥ ३४ ॥
 पितामहे यत् खलु सिंहवर्मा
 पिता च यद्वीरवरः सधन्वा† ।
 जगत्प्रतीवाऽतिशयोऽमुनैव
 महानुभावत्वमतोऽपि यत् तु ॥ ३५ ॥
 यस्य त्यागः सकलजनतापास्तदारिद्र्यमुद्गो

* Unauthorizedly, the stone simply combines the त् and श् of this compound, instead of substituting च्.

† Amended from सधन्वः.

वेलाबन्धुक्षितिधरदरीचारितारिः प्रतापः ।
 ईष्टे स्पष्टं स यदि गणनां तद्गुणानां विधातुं
 वाचां धेनुर्ननु भगवती भारती यस्य वश्या ॥ ३६ ॥
 रुद्राणोमिव भूभृतां परिवृष्टो लक्ष्मीमिवाऽम्भोनिधिः
 कालिन्दीमिव भास्करः स भगवान् ज्योत्स्नामिवाऽत्रेः सुतः ।
 वैदेहीमिव जानकः क्रतुविधिः श्रीनोहलेत्यद्भुतं
 कन्यानाम ललाम तां स सुषुवे सामन्तचिन्तामणिः ॥ ३७ ॥
 भर्तुः पुलोमतनयेव मरुद्गणानां
 द्वायेव दष्टतमसां महसां च पत्युः ।
 देवस्य सा रतिरिवेक्षुशरासनस्य
 केयूरवर्षनृपतेर्दयिता बभूव ॥ ३८ ॥
 देव्या तया मदजलच्छटयेव दन्ती
 बालप्रवाललतयेव तटः पयोधेः ।
 पुष्पश्रियेव च तरुस्तडितेव मेघः
 शोभां स कामपि बभार नरेन्द्रचन्द्रः ॥ ३९ ॥
 निर्मापितं सुकृतसङ्गतये तयेदम्
 अभङ्गघाग्रशिखरखलितोष्णरश्मि ।
 देवस्य मन्दिरमुमाप्रणयैकबन्धोस्
 * त्यानाकृति खयशसामिवचक्रवालम् ॥ ४० ॥
 आकाशयानक्रमखेदितानाम्
 अन्धोऽधिनाथस्य तुरङ्गमाणाम् ।
 फेनाम्बुभिर्निव्यनिघिच्यमाना
 मन्ये समुद्धान्ति न यत्पताकाः ॥ ४१ ॥
 विटङ्गभागेषु दृष्टुं यस्य
 वर्षासु तुङ्गामलसारकस्य ।
 आश्लेषवत्यो नवमेघमालाः
 पारावतालीतुलनां वहन्ति ॥ ४२ ॥
 आसीन् माधुमतेयः
 पवनशिवस्तमनुजयति शब्दशिवः ।
 ईश्वरशिवः पुनाति च
 तस्याऽन्तेवासितां सुहृती ॥ ४३ ॥

तस्मै तपोनिधानाय निपानीयाविपाटकौ ।
 दत्तौ विद्याधनत्वेन ग्रामावग्राम्यथा तथा ॥ ४४ ॥
 धङ्गटपाटकपोखीनागबलाखैलपाटको वीडा* ।
 सज्जाकली च दत्ताः स्मरारये गोष्ठपाली च ॥ ४५ ॥
 ख्यातः श्रीयुवराजदेवनृपतिस्तस्यामभूद् भूपतिः
 श्रीमल्लक्ष्मणराज ऊर्जितमहा भास्वानिवाऽभ्युन्नतः ।
 भूभृत्तुङ्गशिरोभिरङ्घ्रिरुचयो यत्सेविताः श्रीशिवाः
 कामं यः कमनीयसुन्दरगुणैर्नयैर्जिगाय स्मरम् ॥ ४६ ॥
 यस्याऽऽहवे दृढनिपीडितखङ्गकोटि-
 निर्दारितारिकरिकुम्भसमुद्भवेन ।
 वीरश्रियः क्षितितले विततं चतुष्कं
 मुक्तादलेन ननु कीर्तिवधूश्चकार ॥ ४७ ॥
 किञ्च ।
 सा कदम्बगुहा मान्या यत्राऽऽसीत् सिद्धसन्ततिः ।
 तस्याः पुनरभूद् वन्द्यो रुद्रशम्भुर्मुनीश्वरः ॥ ४८ ॥
 तत्र प्रभावमहनीयतमस्य तस्य
 शिष्योऽभवज् जगति मत्तमयूरनाथः ।
 निःशेषकल्मषमघीमपहृत्य येन
 सङ्क्रामितं परमहो नृपतेरवन्तेः ॥ ४९ ॥
 तस्मादभूद् भुवनमण्डलतामवाप्नो
 भूपालमौलिमणिकान्तिभिरर्चिताङ्घ्रिः ।
 श्रीधर्मशम्भुरुचितामलकान्तकीर्तिः
 शैवागमाभ्युनिधिपारमितस्तपोभिः ॥ ५० ॥
 अस्मात् सदाशिवः शिष्यस्तपोराशिरभूत् नृपेः ।
 यस्य पादद्वयं वन्द्यमर्चितं शेखरांशुभिः ॥ ५१ ॥
 अस्मादभून् माधुमतेयनामा
 शिष्यः सुधामा फलमूलवृत्तिः ।
 तपांसि तेजांसि च यत्र वासम्
 अनन्यसङ्क्रान्तिगुणेन चक्रुः ॥ ५२ ॥
 अस्माच् चूडाशिवः शिष्यो वन्दनीयतमोऽभवत् ।

* All grammar is set at defiance, in this line, in the colligation of the names of places.

कर्मजालमलं येन नीतमलं मुमुक्षुणा ॥ ५३ ॥
 अथ सकलगुणानामाकरस्तस्य शिष्यो
 हृदयशिवसमाङ्गो यद्यशोऽद्याऽपि वर्ण्यम् ।
 नृपमुकुटनिविष्टैर्यस्य माणिक्यचक्रैर्
 अद्यत चरणमूलं कान्तमेकान्तवन्द्यम् ॥ ५४ ॥
 विद्यानां निलयेन येन सुधिया सत्यव्रतेनाऽधिकं
 श्रीमन्माधुमतेयवंशविदिता कीर्तिश्चिरं वर्धिता ।
 किञ्च क्ष्मा क्षमयाऽम्बुदः समतया मर्यादयाऽभोनिधिर्
 वैराग्येण जितस्तरः स भगवान् कस्याऽऽस्पदं न स्तुते ॥ ५५ ॥
 किं स्तूयतेऽसौ मुनिपुङ्गवोऽथवा
 श्रीचेदिचन्द्रो नृपतिः कृतादरः ।
 सद्वृत्तभूतप्रहितैरुपायनैः
 प्रादर्श्य भक्तिं विधिना निनाय यम् ॥ ५६ ॥
 श्रीमल्लक्ष्मणराजोऽपि तस्मै सुतपसे स्वयम् ।
 मठं श्रीवैद्यनाथस्य भक्तियुक्तः समार्पयत् ॥ ५७ ॥
 स्त्रीकृत्याऽपि मूनिर्भूयो मठं श्रीनौहलेश्वरम् ।
 अघोरशिर्वाण्यस्य साधुवन्द्यस्य दत्तवान् ॥ ५८ ॥
 अथ स विहितकृत्यश्चेदिनाथः समर्थः
 करितुरगसमग्रः शक्तसामन्तपत्तिः ।
 दिशमतिशयरम्यां सम्प्रतस्थे प्रतीचीम्
 अहितजनितभीतिर्दुर्निवारप्रचारः ॥ ५९ ॥
 समरकृतविकारान् विक्रमेण प्रहृत्य
 प्रणतनृपतिदत्तोपायनैर्वर्धिताक्ष्णः ।
 हृदयनिहितवित्तरर्थिनां पूरिताशो
 जलनिधिजलखेलं सैन्यचक्रं चकार ॥ ६० ॥
 निमज्ज्य यो रत्ननिधौ श्रीमान् सोमेश्वरं शनैः ।
 अभ्यर्च्य काञ्चनैः पद्मैरथोऽन्यत् तु न्यवेदयत् ॥ ६१ ॥
 जित्वा कोसलनाथमोड्रनृपतेराप्तस्तु यः कालियो
 रत्नखर्णमयः स येन विहितः सोमेश्वराभ्यर्चनम् ।
 दत्त्वा यः करिवाजिशुभवसनखक्चन्दनादीन् पुनः
 संसारश्चमशान्तयेऽतिविनतस्तुष्टाव तुष्टः प्रभुः ॥ ६२ ॥
 असारं संसारं य इह मनुते कोऽपि नृपतिस्

त्वदङ्घ्रियानद्या विगलिततमास्तत्त्वनिरतः ।
 न तस्य श्रीभूयो विह्वतिह्वतये जन्मविरहाद्
 इति ध्यानाविष्टः शिवमहसि चित्तं विहितवान् ॥ ६३ ॥
 ओषङ्करगणस्तस्मादभूद् भूमिश्वरो महान् ।
 यत्पादद्वन्द्वमद्वन्द्वं द्विवद्विरपि सेवितम् ॥ ६४ ॥
 सङ्ख्येऽसङ्ख्यविपक्षपक्षदलनव्यासङ्गि खङ्गव्रतं
 यस्याऽऽसीत् दृढसाहसस्य सततं दानं जनानन्दक्षत् ।
 रूपेणाऽप्रतिमो मनोभवभवं दर्पं जहारोद्धतं
 यः सर्वत्र च सर्वकालमवनीनाथः स्तुतः कोविदैः ॥ ६५ ॥
 यत्पादद्वयपद्मसद्म विततं भूतेरभूद् भूषितं
 भूपानां नमतां किरीटविकटप्रान्तस्थरत्नांशुभिः ।
 वक्षोरत्ननिधिं समाश्रितवती लक्ष्मीः क्रमेणाऽऽगता
 वीरश्रीरपरैव यस्य नृपतेः कौक्षेयधाराश्रया ॥ ६६ ॥
 तस्य श्रीयुवराजदेवन्तपतिर्भाता कनीयानभूद्
 भूपैर्यच्चरणारविन्दपतितैर्भङ्गैरिवाऽङ्कस्थितम् ।
 यः सत्यव्रतसत्त्वसूक्तिवसतिः श्रीविक्रमैकाश्रयः
 प्रायस्तस्य न सज्जनोऽपि सकलान्वक्तुं गुणान् शस्यति ॥ ६७ ॥
 दंष्ट्राकोटिविपाटनोद्यवदनः क्रूरखरो भासुरो
 * नेत्रप्रान्तविकीर्णकोपरुधिरः पादप्रचारायुधः ।
 येनाऽऽक्रम्य भुजेन भूमिपतिना लाङ्गलबद्धक्रमो
 दैत्यो व्याघ्रवपुर्हृतोऽतिभयदः शस्त्रीभृता पाणिना ॥ ६८ ॥
 कन्दर्पोऽभिनवः† पुरन्ध्रिनयनप्रीतिप्रदोऽप्यन्यथा
 यः कालः करवालकोटिविह्वतस्थूलेभकुम्भस्थलः ।
 चित्रं यच्च च सरस्वतीकृतरतिः श्रीकण्ठपूजापरश्च
 चातुर्वर्ण्यविचारचारुचतुरो यश्चाऽर्थिचिन्तामणिः ॥ ६९ ॥
 यस्यात्तुङ्गजेत्रमज्जनगलदानाम्बुभिर्मिश्रितं
 रेवावारि विविक्ततित्तमुचितस्नानेन तन्वीजनः ।
 सम्राष्टोरुनितम्बताडनवश्वस्तस्तवीचीचयं
 सर्वाङ्ग‡ स्वरसौरभेण महता निर्याजमायोजितः ॥ ७० ॥

* The च is in place of a letter omitted by the engraver.

† While the vowel of भि is legible, its consonant is entirely rubbed away.

‡ Pieced out from the initial sibilant, the *repha*, and the *anuswāra*.

रामाणां कुचमण्डलेषु नियतं ह्यारप्रकारक्रमात्
 सम्पूर्णं शृङ्गिमण्डले च विमले ज्योत्स्नाच्छलेनोज्ज्वलम् ।
 मन्ये मानसवारि यस्य वितते हंसावलोविभ्रमाद्
 भ्रान्त्याऽश्लेषमुमापतेस्तु वसतौ विश्रान्तिमागाद्यशः ॥ ७१ ॥
 सम्पूज्य देवमीशानं विभवैः स्वैर्यथोचितैः ।
 यथागमं यथाशास्त्रं स्तोत्रं विहितवान् नृपः ॥ ७२ ॥
 अविचलितमनोभिर्यत्स्वमीशं क्षितीशैर्
 विभवविहितकृत्यैरिज्यसे ते कृतार्थाः ।
 य इह कृतविकारा* मन्मथैकान्तचित्ता
 भवति वरद तेषां सम्पदुन्मादहेतुः ॥ ७३ ॥
 समदकरिघटाभिः किं किमङ्गाङ्गनाभिर्
 मदनशयनलीलां भावयन्तीभिराभिः ।
 कनकतुरगवासोरत्नजातैर्न कृत्यं
 न हि भवति भवानीवल्लभस्याऽर्चनं चेत् ॥ ७४ ॥
 भवति नृपतिवंशे जन्म पृथ्वी च भोग्या
 श्रुतमुचितविचारश्चारुरूपप्रभावः ।
 समरविजयसम्पत्तस्य यो निःप्रपञ्चं
 चरणयुगलमलं संश्रितः शङ्करस्य† ॥ ७५ ॥
 किमिह ‡ बह्विभिरन्यैर्नाथ सर्वस्य हेतुर्
 भवतु भवति नित्यं भक्तियोगो ममैकः ।
 सकलसुखविशेषाद् यत्र प्रीयूषवर्षः
 स्वयमनुभवगम्यो जायते त्वत्प्रसादात् ॥ ७६ ॥
 भूपत्रयशोराशिवर्णनं प्रथमं कृतम् ।
 श्रीमता श्रीनिवासेन श्रीस्थिरानन्दस्तनुना ॥ ७७ ॥
 भूपतीनां त्रयाणां तु कीर्तिकीर्तनमुज्ज्वलम् ।
 विहितं सज्जनेनाऽयं सुधिया धीरस्तनुना ॥ ७८ ॥
 पत्तनमण्डपिकायां खव§ * * * * *

* The वि has been restored by guess.

† Of this word the final letter is lost on the stone.

‡ By the fifth symbol of this word, र, a blank has been replaced.

§ Here, at the end of the thirtieth line, the abrasure of the stone gets to be serious; and it continues so in the final characters of the two lines following.

* * * * * द्वसिकाघाणके च षाडघोडसिका ॥ ७६ ॥

तैलस्य मासि मासे दिनमनु च युगायुगे च पौरस्तु ।

यूगफलमरिचश्रुणीप्रभृतिषु भाण्डेषु भरकपौरस्तु ॥ ८० ॥

वीथीं प्रति च कपर्दीं द्यूतकपर्दास्तु शाकवार्ताकम् ।

रसवणिजामादायस्तृणपूलकधीमरादि यत्किञ्चित् ॥ ८१ ॥

दत्ते करीचतुष्टयमङ्गुरङ्गे द्वयं च पौराणाम् ।

यद्वहदन्धू दानं किमपि च विद्याधनं तदुद्दिष्टम् ॥ ८२ ॥

यत्र * * * * * कीर्तयः प्रवर्तन्ते
यत्र च श्रीनोहलेश्वरमठश्रीमदघोरशिवाचार्यामभवत् ।

क्वचि * * * त्तः क्वचिदपि च शाकाद्यवहतिः

क्वचिन् मूलाहारः क्वचिदपि स कन्दाञ्च वुभुजे ।

परं ज्योतिः शैवं विगलितरजस्काञ्चतमसं

विचिन्वन् नो यातोविषविषयवेगस्य कलनाम् ॥ ८३ ॥

तेनेयं प्रशस्तिः सङ्गतिमानीता श्रीचिपुरीसौभाग्यपुरलवणनगर-
दुर्लभपुरविमान * * * * * विष्णु * * भिः काष्ठवृषः

प्रत्यहमथरक्षितः समानेयः देव * * * * * चारावचारुदायि ।

सुस्मियवन्तघटना विस्मितकविराजशेखरस्तुत्या ।

आस्तामियमाकल्पं ह्यतिश्च कीर्तिश्च पूर्वा च ॥ ८४ ॥

कायस्थश्रीसीरुकस्य ।

करणिकवीरसुतेन तुनाईनाम्ना प्रशस्तिरालिखिता ।

सत्सूत्रधारसङ्गमतनूजनोन्नेन चोत्कीर्णा ॥ ८५ ॥

स्वकोय * * * * *

INDEX TO THE METRES OF THE INSCRIPTION.

No. of stanza.

Name of metre.

1, 3, 6, 9, 10, 12, 14, 24, 25, 28, 31, 37, } *S'ārdūlavikrīḍita.*
46, 55, 62, 65, 66, 67, 68, 69, 70, 71.

2, 5, 44, 45, 48, 51, 53, 57, 58, 61, 64, 72, } *Vaktra.*
77, 78.

4, 7, 19, 20, 29. *Sragdharā.*

8, 15, 26, 32, 38, 39, 40, 47, 49, 50. *Vasantatilakā.*

As for the last line of all, the thirty-third, not only are its concluding letters irrecoverable, but equally are about nine letters in two places near its beginning.

From the opening of the seventy-ninth stanza, onward to the termination of the inscription, I can by no means claim for my decipherment unerring accuracy. The personal and other proper names are, by good hap, satisfactorily clear, as some compensation for general uncertainty.

11.	<i>Drutavilambita.</i>
13, 22, 34, 54, 59, 60, 73, 74, 75, 76.	<i>Máliní.</i>
16, 18, 23.	<i>S'ivá.</i>
17.	<i>S'áliní.</i>
21.	<i>Pushpitágrá.</i>
27, 36.	<i>Mandákrántá.</i>
30, 33, 63, 83.	<i>S'ikhariní.</i>
35.	<i>Upendravrjá.</i>
41.	<i>Indravavrjá.</i>
42.	<i>S'ubhá.</i>
43, 79, 80, 81, 82, 84, 85.	<i>Aryá.</i>
52.	<i>Satí.</i>
56.	<i>Indravans'á</i>

Saugor, July 25, 1861.

ADDENDUM WITH REFERENCE TO THE FIRST NOTE AT PAGE 317.

Hiouen-Thsang speaks of a kingdom whose name M. Julien transliterates, from the Chinese, into *Tchi-ki-t'o*, and then into *Tchi-tchi-to*. On the former he remarks: "Le second signe se prononce ordinairement *tchi*. Je le trouve pour *ki* dans *Avalókitéçvara*." At first he gives Chikdha, with an expression of doubt, as the Sanskrit word which it is designed to represent; and he identifies it, absolutely, with Chitor. But Hiouen-Thsang reached *Tchi-tchi-to* after travelling about a thousand *lis* N. E. from Ujjayiní; and neither would the direction nor would the distance take him to Chitor. Finally, without committing himself about the word, M. Julien concludes, that the place intended is Jajháoti,—a modern corruption of nobody knows what.

All this is most unsatisfactory. Hiouen-Thsang, as his itinerary has come down to us, not unfrequently mistakes, alike in respect of names, bearings, and distances. In fact, he opens, with all fairness, a wide door for speculation.

Chedi, we have no ground to question, was a flourishing kingdom in the seventh century; and its extent northerly, from its capital, near Jubulpoor, may have been considerable. The Chinese pilgrim does not tell us, as to *Tchi-tchi-to*, that the capital of that kingdom was visited by him.

Now, does not *Tchi-tchi-to*, contain, almost from M. Julien's own data, the elements, in combination, of Chedi, and of Chaidya; denominating, respectively, a country and a people? *Tchi=che, chai* or *di*: and *to=da, dhya*, or *dyá*; whence it is but just to infer, that it might have stood for *dya* also. Nothing is here asserted; but, considering how often Hiouen-Thsang is detected in blundering, one can scarcely tax with temerity the suggestion, that Chedi; or Chaidya, is somehow meant by *Tchi-tchi-to*.

Furthermore, since *tchi=ki, ke, cha, che, chi, chí, ta, ta, ti, ti, tí, tí, tya*, &c. &c. why may it not replace *kí* and *ka* as well? *To* is acknowledged to answer to *ta* and *ta*. From *Tchi-tchi-to* we may, therefore, without taking any very great license, extract both Kíkāṭa and Kíhaka, real names of countries.

M. Julien certainly merits well of the republic of letters for his translation of Hiouen-Thsang. And yet it is difficult to accept the award, that his method is one of "mathematical certainty;" as it has been called in the *Saturday Review*, Vol. XI., p. 247. Grounds for dissent from this eulogy are even given to us by M. Julien himself, in his treatment of the word just discussed: and additional arguments to the same effect are not far to seek. I will adduce a few.

The substitute offered for the word *Pou-lo-ki-che*, the name of a king of Mahārāshṭra, is Purakes'a, followed by a mark of interrogation. Subsequently, in place of Purakes'a, the translator proposes Pulakes'a, with this note: "Ce mot n'est pas expliqué. La transcription Poulakêça s'appuie sur de bons exemples." Still there is no professed certainty. We see, that, at first, the chances seemed to be in favour of *r*, as against *l*. And, after all, the final vowel is likely to be *i*, not *a*. Pulakes'a, as a name, is, indeed, possible. But Pulakes'i—nominative of Pulakes'in—is the appellation of a king actually mentioned in inscriptions from Western India. Let it be granted, that *Hie-li-k'i-che* is for Harikes'a. Still we lack full proof as to *Pou-lo-ki-che*: for, if *che=s'i*, it may well stand for *s'i* likewise; and, moreover, the slight difference, to the ear, between a short vowel and a long may have been lost, in this instance, on a foreigner. Or, if we assume a mistake of ignorance of Sanskrit, or one of heedlessness, we are not without reason for it. Except for one or other of these suppositions, how are we to account for such an error as Rājavaradhana for Rājyavaradhana? There is no way of escape here; for the word—the name of a

king of Kanauj—is translated into Chinese by “increase of the king,” not “kingdom.” We know, from the *Harsha-charita*, that Rájyavardhana had a sister Rájyas’rí.

Take, again, *Sou-lou-k’in-na*. M. Julien is positive, that this group of syllables stands for Srughna,—a region of whose position there is no warrant for any unhesitating assertion. It is just as likely, equally on graphical grounds, and on geographical, that the territory meant is S’ríkaṇṭha. In the first place, S’ríkaṇṭha would as naturally be softened into four syllables as Srughna into the same number. That Hiouen-Thsang was capable of mistaking the dental sibilant for the palatal, we see in his Subhavastu for S’ubhavastu, Sítá for S’ítá, &c. &c. The element *s’rí*, before being submitted to transliteration, was probably lengthened and dentalized—nearly as we hear it vulgarly uttered in the present day—to *sarí*. For the *sa* of Támrasavana, we have, in Chinese, *sou*. *Lou*—see *Méthode*, &c., pp. 148, 149—is equivalent to *lṛi*, *lṛí*, and *ra*. Why not to *rí* also? *K’in* is the same as *kam* in *kambala*, and *kin* in *kinnara*; and *kaṇ* is here a sort of medium. As for *na*, if, among its vagaries, it takes the place of *ḍa* in *Chañḍa*, it is no very violent supposition, that it may do duty for *ṭha*. The fact is, that M. Julien has to deal, in *Sou-lou-k’in-na*, with combinations which ill authorize him to pronounce as if it could infallibly be read into Srughna.

With reference to *Po-ni* there is also deficiency somewhere. M. Julien allows us to elect between Bání, Bhani, and Bhaní, in the Sanskrit. In his *Méthode*, &c., p. 175, he leaves it to be gathered, that *Po-ni* acts for *bání*, “language;” but he gives no authority. On his own showing, *Po-ni* may likewise be for the correct Sanskrit *vání*, or for *pání*, &c. &c. And why has he not translated the Chinese renderings of *Po-ni*, *Ming-liao* and *Pien-liao*? Professor Lassen puts Bâpin, and adds: “Dieses ist die richtigere Herstellung dieses Namens; Bâpin bedeutet auch Redner; die gewöhnliche Form ist Vâpin; in der Lebensbeschreibung lautet er Bhañi.” *Indische Alterthumskunde*, Vol. III., p. 673, second foot-note. In truth, as I have shown, we should read Bhañḍin. See my Preface to the *Vásavadattá*, p. 52.

So long as M. Julien has to do with Chinese barbarizations of significative words from the Sanskrit, and is aided by analytical or other translations of them, he may be followed with full reliance.

BRASS VASE FROM WARDAK.

1. Line
 2. Line
 3. Line
 4. Line
 5. Line
 6. Line
 7. Line
 8. Line
 9. Line
 10. Line
 11. Line
 12. Line
 13. Line
 14. Line
 15. Line
 16. Line
 17. Line
 18. Line
 19. Line
 20. Line
 21. Line
 22. Line
 23. Line
 24. Line
 25. Line
 26. Line
 27. Line
 28. Line
 29. Line
 30. Line
 31. Line
 32. Line
 33. Line
 34. Line
 35. Line
 36. Line
 37. Line
 38. Line
 39. Line
 40. Line
 41. Line
 42. Line
 43. Line
 44. Line
 45. Line
 46. Line
 47. Line
 48. Line
 49. Line
 50. Line
 51. Line
 52. Line
 53. Line
 54. Line
 55. Line
 56. Line
 57. Line
 58. Line
 59. Line
 60. Line
 61. Line
 62. Line
 63. Line
 64. Line
 65. Line
 66. Line
 67. Line
 68. Line
 69. Line
 70. Line
 71. Line
 72. Line
 73. Line
 74. Line
 75. Line
 76. Line
 77. Line
 78. Line
 79. Line
 80. Line
 81. Line
 82. Line
 83. Line
 84. Line
 85. Line
 86. Line
 87. Line
 88. Line
 89. Line
 90. Line
 91. Line
 92. Line
 93. Line
 94. Line
 95. Line
 96. Line
 97. Line
 98. Line
 99. Line
 100. Line

Translation of a Bactrian Inscription from Wardak in Afghanistan.—By *Bábu RÁJENDRALÁLA MITRA.*

In Mr. Edward Thomas's excellent edition of James Prinsep's *Essays on Indian Antiquities* (Vol. I. p. 163) occurs the facsimile of a Bactrian inscription found in one of the topes of Kohat in the district of Wardak. Mr. Masson, who discovered it, states with reference to the locality where it was found, that the topes are "situated on the course of the river, which, having its source in the Hazrajat, flows through Loghar into the plain east of Kabul, where it unites with the stream passing through the city. They are distant about thirty miles west of Kabul. There are five or six topes, strictly so called, with numerous *tumuli* I found that three or four of these structures had been opened at some unknown period. . . . In the principal tope an internal cupola was enclosed, or rather had been; and one of those unexplained tunnels or passages led from it towards the circumference. I directed certain operations to be pursued, even with the opened topes, and pointed out a number of *tumuli* which I wished to be examined, as they were very substantially constructed: the results proved successful, in a great measure, and comprised seven vases of metal and steatite, with other and various deposits."* The inscription itself was found punched on one of the brass vases which, from the circumstance of having been thickly gilt, was in an excellent state of preservation, and shewed the dotted legend with great distinctness. In shape the vase was very similar to the ordinary Indian *lotas* or water vessels of the present day.

Adverting to the perfect legibility of the record, Mr. Thomas remarks: "Though it offers this immense advantage over the parallel inscription on the Manikyála stone, it has its corresponding drawbacks in the new and unknown forms of many of its letters, and the little care that has been taken to mark the nicer shades of diversity of outline which, in many cases, constitute the only essential difference between characters of but little varying form. As it shares the present reproach of being unintelligible in its language, we are of course deprived of any data whereupon to found conjectures as to the values of the unknown characters, and, with very limited exceptions, we are equally denied any aid towards supplying, by the tenor

* *Ariana Antiqua*, pp. 117—118.

of recognised words, the deficiency in the due fashioning of the letters of which they should be composed." "But as all incertitude invites a corresponding degree of license in purely tentative readings, I may be permitted to refer to some isolated words that seem independently to convey their own meaning. Such for instance as विहार for विहार *vīhāra*, 'a monastery,' a standard term in Buddhist phraseology: and one that may be seen to occur in the side-legend on the Manikyāla stone. The title of भगवण् *Bhagavan* may also be doubtfully indicated, as likewise the शरिर for शरीर *śarīra* 'relic:' which has also been previously met with. The Mahārājārājādhirāja's name I read preferentially as Hoveshshandra, but the final compound is altogether an arbitrary assignment, and the rendering of the *ve* is similarly open to correction. However to spare my readers any further comment upon such doubtful materials, I may add, that though I can offer but little recommendation for my transliteration, I may venture to invite the attention of those who would follow up the study to the copy of the original inserted in the plate, which I have done my utmost to give accuracy to."* I quote Mr. Thomas's remarks in full to shew the little advance that had been made by him in decyphering the monument under notice. His invitation remained unattended for three years, when Mr. E. C. Bayley took it up and brought his profound knowledge of Indian antiquities to bear upon the puzzling record. His perfect familiarity with the numismatic palæography of this country, his conversancy with the peculiarities of the Pali and its sister dialects, and his general scholarship, enabled him at once to perceive the language and character of the monument, and to explain several of its difficult passages. His translation of the entire document, however, did not prove satisfactory to him, and it was therefore placed at my disposal for farther examination. In taking up a task which had thus already passed through the hands of two such distinguished antiquarians, I felt extreme diffidence; and if I have too largely taken exceptions to their decypheringments in the following remarks, they are due entirely to the advantage I have had of consulting the results of their researches, and not to any want of appreciation of their value, and I take this opportunity thankfully to acknowledge the great assistance I have derived from their labours in preparing the following transcript and translation. In reading the characters, I

* Prinsep's *Indian Antiquities*, loc. cit.

have depended entirely upon the alphabets supplied by Mr. Thomas in his essay on Bactrian writing, and by Professor Wilson in his reading of the Kapur di giri inscription, and taken Mr. Bayley's transcript for my guide with regard to compound letters. I do not, nevertheless, wish to submit my reading as other than tentative. In decyphering documents of which the characters are, to some extent, unknown, the letters most carelessly written, the vowel marks frequently omitted, and the language corrupt,—in short of which the language, character and grammar are all, more or less, doubtful,—a great deal is done by guesses, of which some may be happy, but others must be wrong; I keep myself therefore fully prepared to surrender my version, whenever further research will suggest another better fitted to suit all the requirements of the monument.

The record opens with the word *sam*, the usual abbreviation for *samvat*, the era when it was inscribed, and the year is indicated by the figures which follow; but the nasal mark under the sibilant is peculiar. It bears no resemblance to its counterpart in the Kapur di giri inscription, where it is indicated by a triangular mark resembling an arrow-head placed under the letter, or to the semi-circular mark or the dot elsewhere used; but if allowance be made for the carelessness with which the characters are punched on the urn, and the fact of their having been formed by a series of dots and not by lines, the difference is not sufficient to justify any doubt as to the accuracy of the reading.

The figures which follow are three in number, of which the first two are exactly alike. There is little, however, to aid us in ascertaining their values. The first figure looks like 1, and the other two may be compared to the modern Sanskrit 3, which together, reading from the right, would amount to 331. This, however, did not at first sight appear to me to be satisfactory, as I knew that there was a Sanskrit inscription some time ago found at Mutra and recorded during the reign of Huviska, the prince named in the monument under notice, which bore date the 417* Samvat, and it was natural to expect that the century alluded to in the two documents should be the same. As Kaniska and his brother Huviska reigned before the commencement of the Christian era and contemporaneously with Vikramáditya, the Samvat alluded to by them, I thought, must refer to other than

* So read by Mr. E. C. Bayley.

that of the last named prince. Further, as the princes named, although Tartars by birth, were staunch Buddhists by profession, I supposed that it would not be unreasonable to assume that they had adopted, with his religion, the era of their patron saint and reformer, and the century of Huviska would therefore be the 5th and not the 4th. According to the most recent calculations* Buddha died 477 years before Christ, and the Tartar princes Kaniska and his brothers Huviska and Juska lived between 42 B. C. and 18 A. C., consequently their age after the Nirvána should be 441 to 497. Col. Cunningham places the accession of Huviska 41 years and 9 months before Christ,† or 436 years after the Nirvána, which would very closely accord with the date of the Wardak record, if its figures be taken for 441. That the era of Buddha (*Buddhakála*) was at one time current in India, as it is to this day in Ceylon, there can be no question, and that a zealous follower and prince should adopt it at a time when the religion of Śákya was at its culminating point, was certainly not improbable. No doubt this mode of arguing would have the appearance of postponing facts to theories, but it would not, I thought, be deemed illegitimate in cases where the value of figures has to be deduced from our knowledge of the contents of the documents in which they occur, and by a calculation of probabilities; though the result must, in such cases, remain open to future correction.

There are serious objections, however, to this reading of the date, and the most important of them appears to be the fact that the ciphers used are identically the same as those found in Sanskrit inscriptions of the 1st century before Christ, which necessitates our reading them from the left to right, and thereby removes the possibility of the first two figures being of the same value. Messrs. Bayley and Thomas take the date for 133, reading from the left to right. Col. Cunningham, I understand, follows the same mode of reading, but by assigning different values to the figures, makes them stand for 377. If, as no doubt is the case, all the ciphers used in Indian writing are nothing more than contractions of words or modifications of their initial letters, *a priori*, the argument in favour of reading them always from the left, whether they be found in Arian or Semitic records, would be strong, and yet there is nothing absolutely to

* Müller's History of Sanskrit Literature p. 263 et seq.

† Numismatic Chronicle, Vol. VI. p. 18.

forbid their being written differently from left to right and right to left according to the genus of the characters with which they are associated. As long, therefore, as an inscription is not found in which the ciphers are given with their values in words, as in Dr. Burn's Guzerat plates, it would be impossible to come to a correct determination of the question at issue, and we must, consequently, leave the settlement of the date of our inscription for future research. The second and the third figures occur in Col. Cunningham's Eusofzye inscriptions, and the first occurs in them as well as in the Muttra inscription.

The first letter after the figures is an *m*, but the next is uncertain. Mr. Thomas takes it to be a *म्* and Mr. Bayley a *च* or a *स्य*. Apparently it is a compound letter, but a *च* supplies the meaning best: *मस* *masa* for *मास* *māsa* 'a month;' the substitution of a short for a long vowel and even the omission of vowel marks not being of much concern in Bactrian writing. May be the two letters *masya* stand as an abbreviation of *māsasya* "of the month." The next word is *aphtha* according to Mr. T. and *athva* according to Mr. B. I feel disposed to take it for *aṭha* "eight," which with the *chitriyasa* after it, would mean "on the 8th of the month of Chaitra." The first letter of the last word, should, according to modern Sanskrit, be read *chai* for *chaitra*, the month in which, on the day of the full moon, the moon is in the constellation *chitrā*, but the non-prolongation of the vowel is not positively objectionable. In Col. Cunningham's Eusofzye inscription the word is written *chitrasa*. The word *aṭha* being placed between *māsa* and *chaitra* might mean "the 8th month chaitra," but if the *aṭha* be joined in samāsa with *chaitra*, the difficulty would be overcome. According to Mr. T. the *chai* should be read *mī*.

The next two letters are very doubtful, Mr. B. reads them *vrehi* and Mr. T. *stehi*; neither of which supplies any meaning. In the position in which they appear in an oriental writing, they are expected to represent either the name of the day of the week, or the day of the moon's age. I think they are the initial letters of *Vrihaspati* or Thursday; although the vowel mark, not having been prolonged below the horizontal stroke of the *v*, looks more like *e* than *i*. This, however, is not of much consequence, as we occasionally see that the *i* is not prolonged. The ciphers which follow ought to represent the moon's age. The first

of them is similar in form to what has been read as 1 by Messrs. Bayley and Thomas, and 3 by Col. Cunningham, and the second is like a \times which they unanimously take for 4, which would make the ciphers stand for 34—43 or 14—41, as we read from the left or right, and adopt the valuation of Messrs. B. and T., or C. Now as the moon's age cannot exceed 15 according to the usual mode of reckoning, and even if the waxing and wane were counted together would not exceed 30, either the ciphers do not represent the higher figures, or they cannot stand for the moon's age. By accepting Messrs. T. and B.'s valuation and reading from the right, the ciphers might be made to stand for the fourteenth lunation, but in the Eusofzye inscription above alluded to, the name of the month is followed by two crosses thus "*mitti* \times \times ," which if taken for the lunation would be absurd. It is possible that the five letters between *chitrasa* and *mitti* which are yet undecyphered, might show us that the two crosses in the record are not intended for the lunation, while there being nothing unintelligible before or after the ciphers in the Wardak inscription, they might be the representatives of the moon's age. As long, however, as we have not the means thoroughly to determine the values of the ciphers, it would be a waste of time to argue upon the subject.

The words *imena gatrigena* after the date, are distinct. Then follow *samagusa putra Ugamategasya*, the former of which may be *pamagusya putra* and the latter *Nagamanegasya* or *Vagamategasya*. If the facsimile in Thomas's Prinsep may be relied on, and there is not the least doubt of its accuracy, the *y* after the last two words and the *t* in the middle of the last, are undoubted; while the initial letter of the last word is very unlike an *n*.

Next follow the words *iya* "this," *khasavamri shekhala siga* (for *sringa*) "on the peak of the Khasavamri hill" (*sekhala* for *sekhara*) and *Ugamatega vihāra* "the monastery (*vihāra*) of Ugamatega or Vagamatega."* Messrs. B. and T. read the second word differently. B. makes it *khaba dharmasatasa siga* and the latter *khannagravana siga*, but the facsimile does not support their readings. The *sa* of *khasa* and the *kha* of *sikhala* are however doubtful; the *kha* is particularly so, but more from its diminutive size than from its contour. The use of the *l* for *r* in *shekhala*, and *siga* for *sringa*, are well known Pali peculiarities which need no comment.

* Note "*Khaba*" = "*Khamba*" = "*Sthamba*."—E. C. B.

The subsequent word of four letters is unintelligible ; from the letter *mri* I feel disposed to take it for an obsolete participle of *nirmán* 'to build.' The two letters after it, *bh* and *ga* are distinct. They, no doubt, make with the letter following *Bhagava*,* though the last is peculiar and seems to be joined to the next, *kha*. Assuming it to be distinct, we have after it *khasasya kshīṇa sarira*, which together means, "the relic of the body of Bhagaván Khasha," or rather "the emaciated or reduced (kshīṇa) body of Bhagavan." Mr. Bayley reads *Sákya* for *Khasa*. Mr. Thomas's transcript of it—*Bhaga-a-naya-shtra satita patidhabeti* is perfectly unintelligible.

The last word of the line is *paridharetī*, the verb of the sentence. In Sanskrit the root *dhri* in the active voice, becomes *dharati* when meaning "to fall," *dhriyate* in the sense of 'remaining' or 'continuing,' and optionally *dharati*, *dharate* or *dhārayati* 'to keep' or 'to hold ;' the passive form being *dhriyate* or *dharyyate*, and the causal *dhārayati*. In the active voice in the Prakrit, *dharati* becomes *dharedi*. What the intermediate Pāli form was, is not known, but judging from the nominative of the sentence under examination being in the 3rd or instrumental case, I am disposed to believe the Bactrian Pāli form of the passive to be *dharetī*. If this be admitted, the words of the first line put together would mean : "By this Gatriga, the Ugamatega monastery on the peak of the Khasavamri Hill, belonging to Ugamatega (or Vagamatega or Nagamanega) the son of Samagu (or Pamagu) was made to hold the relic of Bhagavan Khasa."

The first word of the second line is distinct enough ; but the letter following it is a puzzler ; it looks very unlike any Bactrian letter that I know of. Mr. T. reads it *shu*, while according to Mr. B. it is *ku*, which with its successors *sa* and *lu*—the last doubtful—makes the word *kusala*. Mr. T. does not attempt to read the next letter. Mr. B. takes it for a *ṭ*, which with the following letters *lena* would represent *kusalāṭalena* "by unshaken blessings," but, as the letter has been above met with before *sarira*, where *khi* appears to be the probable reading, for the sake of consistency I must here take it for a *khi* and make the passage *kusalākhiṇena* "by innumerable blessings." The word is in the instrumental case, and cannot be in concord with what follows unless we take the sentence to be elliptical. If the

* The Burmese vocative of Bhagavan is Bhagava. We have it here in *samāsa* with *khasa*.

ellipsis be filled up with the words “the fruit that may be produced by this &c.” are as the Sanskrit grammarians would have it, *anena (imena) yat falam jātum tat*. The next clause *Mahārāja rājātirāja Huvishkasya agabhagae bhavatu*, is, I think, undoubted; but Mr. B. reads *Maharājā-tirājā* dropping one *rāja* (evidently a *lapsus pennæ*) and Mr. T. has something very different. The meaning of the sentence depends entirely upon the word *agabhagae*. Mr. B. takes it to mean “an expiation for sin,” but upon what authority I am not aware of. Neither *aga* nor *bhaga* means “sin” or “expiation,” and the Buddhist liturgy does not afford us any information regarding an expiatory ceremony of the name of Agabhaga. The Sanskrit word *agha* means ‘sin,’ and *bhaga* might be taken for *bhanga* ‘to break,’ but as the Bactrian alphabet has a character for *gh*, it would not be reasonable to suppose that *g* would be substituted for it in words that require the former. Farther, if the compound word be intended to mean “an expiation for sin,” it would be a question why should the “expiation” be prayed for the king and royal personages only, and parents and relatives be left to content themselves with a different blessing, as we see they are, in a different part of the document? The most natural radicals for *agabhaga*, it strikes me, would be *agra* ‘first,’ ‘foremost,’ ‘chief,’ ‘prime,’ and *bhaga* for *bhāga* ‘a share,’ and the two together mean ‘the first share’ or ‘royal tithe.’ The last word with the affix *dheya* means the ‘royal revenue.’ If this explanation be correct, the meaning of the whole sentence would be: “May the reward that is produced by this repository of innumerable blessings (relic deposit) prove (as it were) a royal tithe or a first offering to Huvishka, the great king and king of kings.” I think, however that *bhaga* here stands for *bhāga* “fortune,” and the sentence is an invocation for the good fortune of the sovereign. Mr. B., mistaking the meaning of the verb *bhavatu*, has translated this and the following sentences in the past tense.

The next sentence runs thus *mātāpitā nāme pushae bhavatu*, the only letter doubtful being the *tā* of *pitā*. Mr. B. explains *pusha* to be “a religious offering,” but upon no satisfactory authority. I feel, therefore, inclined to take the word in its radical sense of ‘nourishment,’ ‘protection’ or ‘prosperity,’ and translate the whole phrase “may it be to the prosperity of the name of (my) mother and father;” the word *nāme*, however, is not in grammatical concord unless *nāme* be equivalent in Bactrian Pali for the Sanskrit *nāmnā*. This is followed

by seven other clauses of very much the same construction, invoking diverse blessings for different individuals. The first runs as follows ‘*bhráta náme hasphanimategasya pushaë bhavatu*’ “may it be to the prosperity of (my) brother Hasphanimatega.” The second *Suchyami bhushana tigamitrasya bhrátigana pushae bhavatu* means, “may it be to the prosperity of the brothers of Tigamitra, the ornament of Suehyami,” the doubtful word being the first—*suchyami*. The third clause prays for the successful “control of the royal revenue” “or control over good fortune,”—*Agabhagaparisásana*, in behalf of Ugamatega (or Vagamatega) who is described as a *mahisachya*, but what the purport of that epithet is, it is difficult to divine. It might stand for *mahá* and *suchi* the “highly pure,” or more probably for *mahá sachíva* ‘the great minister.’ The fourth prays that the offering might prove conducive to the moral improvement of mankind. It begins with the letters *s*, *th*, *s*, *re* and *na*,—the *th* and *re* being very doubtful. Mr. B. takes the *th* for *rv*, which reading I wish very much to adopt, though opposed by Mr. Thomas and somewhat by the form of the letter. The *re* I take to be a *tv* ill-formed by an illiterate scribe or engraver. The word would then be *sarva satvena* which followed by *áryagati chinæ bhavatu* would as aforesaid mean, “may it be to the following of the árya course of life by all mankind.” The fifth has a long string of names of objects most of which are unintelligible. For all of them (*sarvena*) prosperity (*pusha*) is invoked. The sixth is not so obscure, it prays for “control over good fortune” *agabhaga parisásana*, in behalf of those who observe the *abasatha* or the four months’ penance during the rains i. e. the elergy, including their “domesties,” *parivára*, as also “such men” (*satvasaṅgha*) as are ‘capable of noble conduct’ *mahisacharyarhana*. The seventh invokes “good fortune,” *agabhaga*, for one Mistugra—but the word not put in the dative as it is in most of the preceding passages.

The fourth or the last line is unconnected with the above, and written in a different style. It records that the “vihára” in which the relic was deposited “was the asylum,” *patigaha* for *pratigraha* ‘the accepted gift,’ “of the houseless” *asanthánána*, “of the great congregation,” *mahásanghigana*. The compound consonant *ng* is the only letter which appears peculiar in this line. The mahásanghas were the great sectarians who adopted the doctrine of Ráhula, the son of Buddha.

The historical facts deducible from this record are of considerable importance. We learn from it ; 1st, that the well known Tartar prince Huvishka of Kashmir had extended his dominion to the west many miles beyond Kabul. To the south, the Muttra inscriptions inform us, that his arms extended to as far at least as that city ; 2nd, that in his western dependency the prevailing religion was Buddhism ; 3rd, that the Buddhism most common then was most probably of the form adopted by the Mahásanghas ; 4th, that the people of the country at the time used a form of the Pali for their vernacular and had their months and days named after the Hindus : 5th, that although the language of the people was the Pali, their personal names were either other than of that language, or compounds partly Pali and partly foreign.

TRANSCRIPT OF THE WARDAK INSCRIPTION.

- (१) सं ४४१ मस अठ चित्रीयस वेहि १४ । इमेन गत्रिगेन सम-
गुस्य पुत्र उगमतेगस्य इय खण्वन्नि सेखल सिग उगमतेग
विहार निफुनिर्मि (?) भगव खण्वस्य खिनणरिर परिधरेति
- (२) इमेन कुणलाखिलेन महाराज राजातिराज ऊविष्कस्य अग-
भगए भवतु, माता पिता नामे पुणए भवतु, भ्रात नामे हस्सणि-
मतेगस्य पुणए भवतु, शुचमि भूणन तिगमित्रस्य अतिगन
पुणए भवतु, महिणच्य उगमतेगस्य अग भग परिणणन
- (३) भवतु सर्वसत्वेन आर्य गतिचीणए भवतु, अतिय नवु गपय्व
वण अण्वगघा अत्र अवर अजड स्यलशुग ण्णै विगअतु पुत
सर्वेण पुणए भवतु, महिणचय्यार्हण सत्वसङ्गेन अवघतिगनस्य
परिवरच अगभग परिणणन भवतु, मिस्तुयस्य च अगभग
भवतु
- (३) एघ विहार असंथानन महासङ्घीगण पतिगह

TRANSLATION.

San, 441 (?) ; the 8th of the month of Chaitra, Thursday, the 14th (?) lunatiou. This Ugamatega* monastery (vihāra) on the peak of Khasavamri hill, raised by Ugamatega, the son of Samagu—has been made by Gatriga, to hold a relic of the body of Bhagavan Khasa. May the fruit of this depository of innumerable blessings (relic deposit) be conducive to the good fortune of Huvishka the great

* This proper name I take to be that of the place.—E. C. B.

king and king of kings! May it be to the prosperity of (my) parents! May it be to the prosperity of (my) brother Hasphanimatega! May it be to the prosperity of the brothers of Tigamitra the ornament of Sachyami! May it ensure, to the highly pure (or the great minister) Ugamatega, control over good fortune! May it prove conducive to the moral improvement of mankind! May it be (unintelligible)! May it ensure control over good fortune to those who observe the autumnal fast *abasatha*, as also to their domestics and such pious congregations as are capable of noble conduct! May it ensure good fortune to Mistugra!

This vihára is the asylum of the houseless of the great congregation.

Note on the above.—By E. C. BAYLEY, Esq. C. S.

I have but little material to add to the remarks of Babu Rajendra Lal Mitra. My own share in the task of decipherment has not been large and did not extend to any extent beyond the two first lines, and even on those two lines I confess myself in one or two places, notwithstanding that Babu Rajendra Lal's assistance has been rendered, still very dubious of the rendering attempted.

I wish, however, to explain on one or two points the reason which induced me to adopt particular opinions, to some of which I am still inclined to adhere.

In the first place I wish to say that the reading of the ciphered dates on the Muttra, Wardak and Eusofzye inscriptions given as those adopted by Col. Cunningham and myself are at present almost purely conjectural.

But the Muttra and Wardak inscriptions both contain the name of the same king Huvishka (in all probability the Hushka of the Raja Tarangini and the Oerki of the Indo-Scythians) and are *probably** nearly contemporaneous. There is, I think, if this be the case, little doubt that both cannot have reference to the same æra.

* I say "probably," the Wardak inscription referring personally to the king Huvishka is certainly of his date or near it—the illustrative inscription speaks of the Vihar of the great king Huvishka and *may* possibly be of a later date, but as it is inscribed on an subcysal part of the main buildings it is not likely to be so.

My reason for saying this is, that though one inscription is in the Arian and the other in the square Indian character, yet they both employ the *same* kind of cipher to express the date of the year, thus the figure which I take to express the cipher "1" is associated in the Wardak inscription with the figure which I understand as the cipher "3," and in the Muttra inscription with those which I read as "4" and "7," and the ciphers which I take to be "3" and "4" occur together on one of the Euzofzye inscriptions of Col. Cunningham.

Expressed therefore in the same class of ciphers, it is to be presumed that the date is to be read the same way, and if this is the case, the numbers are so widely differing that they cannot by any probability refer to the same æra.

It is by no means necessary that they should do so, different æras certainly prevailed in different localities, and the localities of Wardak and Muttra are so far apart, that the presumption is decidedly against the æras being identical.

It is, however, just possible but not probable that the mode of reading the ciphers may have followed the reading of the letters with which they were associated. If so, the Wardak date might be read from right to left and the Muttra one from left to right.

In such case I would render the Muttra date as 417 still, and the Wardak date as 331, and the date of the month on Sunahar as 14.

In respect of the double "4" on the Eusofzye inscription in the place of the month to which Babu Rajendra Lal refers, I think it may possibly be explained by a practice which certainly obtains on the Muttra inscription of Huvishka, and one or two others found with it of writing in *abstract* the *number* of the month and *number* of the day of the month, as is customary in commercial and official correspondence of the present day, as for example for the 1st of January to write /1/1/, and the double four may consequently stand for the fourth day of the fourth month.

But the subject is one full of difficulty, and I merely give the above remarks briefly to exemplify this, and to show why I cannot accept the version of the date which is given above by Babu Rajendra Lal.

The æra in the Wardak and Muttra inscriptions may be that of the Nirvana of Buddha, the Seleucidan æra or some other yet unidentified.

As to the word "Vrehi," it is I fear so clear, that it can hardly read otherwise, but it very probably is some local contraction or corruption of Vrihaspati as Babu Rajendra Lal supposes.

The proper name read "Ugamatega" occurs twice. I think the first letter cannot without violence be read otherwise than "va" or vá.

The words before "Bhagavat" which Babu Rajendra Lal omits as unintelligible, seem to me to contain some play upon the root "mri" and perhaps may be some epithet like "dead but undying" applied to the "Bhagavat" or "Sarira."

I wish very much that I could give my adhesion to Babu Rajendra Lal's reading of the second word of the second line,* but I do not think that the letter read as "kh" can by any possibility be so accepted, the general meaning, however, of the passage cannot be much altered by any substitution of the word.

As to the words "aga bhaga," "pusa" and "bhavatu," I have to explain that I had read the latter not as "bhavatu" but as "ebhavutu," supposing a corrupt form of conjugation.

I think it will be found that, in the Manikyala inscription, a still greater deviation from the Sanskrit mode of conjugating the verb "to be," exists, but I cheerfully accept the "bhavatu" as read by Babu Rajendra Lal, transferring the supposed initial "e" to the preceding nouns as the sign of their oblique form.

As to "aga bhaga," my reason for reading it as an expiation for sin was, as Babu Rajendra Lal surmises, an impression that the first syllable was a corruption for "agha," the latter I supposed might represent the Hindu "Bhagut lena" to work out or expiate; however "aga bhaga" if it can be taken in the sense of good fortune is doubtless far better reading, so also for "pusa," for which I was obliged to coin a meaning in the absence of any satisfactory one available to me in Wilson's (first) Sanskrit Dictionary, the only one at the time available to me.

* It occurs also quite clearly in the Manikyala inscription.

The word occurs in the inscription on the steatite vase found by Mr. Masson at Bimaran and figured by Jas. Prinsep, as from the brass cylinder found at Jelalabad.

The second version of the inscription, that on the lid, I read as sira (for sri) Vichitrassa, Nirvedhata putrassa, nananehi, Bhagavátassa Sarirehi.

The fourth word is evidently the substantive of the sentence and is some such word as "gift" or "offering."

The sentence on the lid is the abbreviated form of that on the box and on the latter just preceding the name Vichitrassa the word "pusa" occurs.

"Hasphimatega" I read "Hashtwanammatega."

I cannot see that the first word of the second clause of the third cone can read anything except "sarvassa," there is no resemblance to "th" in the second letter.

With the above exceptions and explanations, I am disposed to accept Babu Rajendra Lal's version and to join with him in putting it forward not as a finished decipherment, but as an attempt to assist the enquiries of other students.

To those who study the Manikyala inscription, it will be manifest that the inflexions are many of them the same as those of the Wardak inscription, and as the name of Kanishka occurs in it, it is probably of nearly the same date, but the ciphers which I would read 441 or 144, add a fresh complication on the question of dates, and I think prove conclusively that the "æras" employed at Wardak and in Upper India *must* have been different.

P. S.—Since writing the above I have seen Mr. Trumpp's paper (Journal Roy. As. Soc.) on the Kafir language.

He gives I see "s'iga" as the pronoun "that," and "Imena" would be the oblique form of the pronoun "I" in that form of Pracrit. I prefer, however, to take it from the context as the oblique form of "iya" which seems to be the pronoun "this."

But I am on further consideration inclined to give up "Gatriga" as a proper name and to take the concluding verb of the first clause as in the *active* sense, which, as it is not in any pure Sanscrit form, may easily be allowed.

I would therefore read the first clause thus—

"Imena gatrigeno Samagusa putra Vagamitegaso iya khaba dharma-

satasa siga Vagamitega Vihar Mritwa-vrimri Bhagavat S'akyadanna s'arir paridhareti or patidhareti."

And I would suggestively translate "In this "gatrige"* the son of Sama Gusa of (the village of) Vagamitega has placed this pillar (of religion and virtue? ?), and that monastery of Vagamitega for the relics of the divine S'akya."

~~~~~  
*Contributions to Indian Malacology, No. II.—By MESSRS.*

WILLIAM T. and HENRY F. BLANFORD.

Of the shells described in this paper, a portion were obtained by ourselves, partly from the Nilgiris, and partly from the plains of Southern India: the remainder are from two very interesting collections, made by Messrs. King and Foote, of the Geological Survey of India, chiefly upon the ranges of hills known as the Shevroys, the Kolamullies, the Patchamullies and the Karlyenmullies, the first and fourth being about 6000 ft. high, and lying a few miles east and north of Salem, the second but little lower, and about 40 miles N. W. of Trichinopoly and the third to the north of Trichinopoly and not exceeding 3000 ft.

We have to regret the loss of a third collection, which was made by Mr. King at the base of the Anamullies, the highest range in Southern India, lying S. W. of Coimbatore and of the Nilgiris. The vessel, on board of which the shells were forwarded, was lost on her way from Madras and Calcutta, and Mr. King has not been able to obtain any more specimens.

The Kolamullay collection has yielded new species both of *Alycæus* and *Diplommatina*, and, from the presence of several Nilgiri forms, has proved of great interest. We trust that the result will induce further researches to be made among the hill groups of Southern India: the Anamullies and other Southern ranges will unquestionably largely reward any collector. From their neighbourhood, Mr. Benson has lately described† the largest Indian *Helix* yet discovered, *H. Basileus* B., which measures nearly 3 inches in diameter, and where so fine a species has been long overlooked, we may be certain that many of small size remain undescribed. The whole of the peninsula South

\* Possibly "cross way," this is the position in which topes are usually found and in which they should be regularly placed.

† In the Ann. and Mag. Nat. Hist. for February, 1861.



of the Cauvery requires examination, and we are convinced that many novel forms may yet be obtained from the Western ghats.

We would especially call attention to the more minute species, and above all to any forms belonging to the genera *Alycæus*, *Diplommatina*, *Opisthostoma*, *Cyathopoma*,\* or *Jerdonia*.† The fresh water shells also deserve notice. A peculiar species of *Veritina*, *V. Perotteti*, is, so far as we are aware, confined to the feeders of a single stream on the Nilgiris, the Pykara, and we learn from Dr. Jerdon that he once obtained in the neighbourhood of Mercara, but subsequently lost, a few specimens of another peculiar species, which he was never able to find again elsewhere. Probably other species also may be found.

No. 1.—*Diplommatina Kingiana*, n. s. Pl. 1. fig 2.

Testa dextrorsa, subrimata, ovato conica, glabra, tenuis cornea ; spira conica, apice obtusa, sutura impressa. Anfr.  $5\frac{1}{2}$  convexi ; antepenultimus major, ultimus parum angustior, antice ascendens. Aper-tura subverticalis, circularis, plicâ columellari nullâ ; peristoma subduplex, incrassatum expansum ; internum continuum.

Long. vix 2, Diam. 1, Aper. diam.  $\frac{2}{3}$  mm.

vel „ .08 „ .04 „ .026 unc.

Hab. in Montibus Kolamullies dictis, prope urbem Trichinopoly, Indiæ meridionalis : teste W. King.

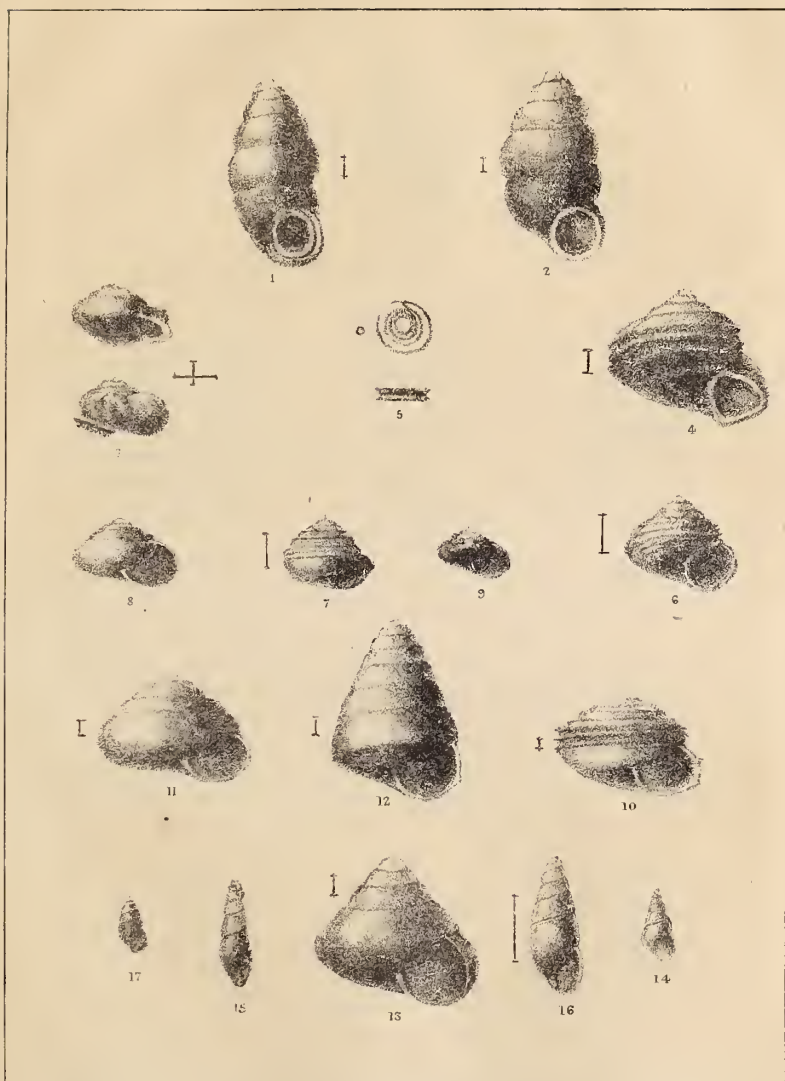
This little species is a near ally of *D. Nilgirica*, Blanf. Pl. 1. fig. 1., but amply distinguished, both by its smaller size, and by the absence of the basal keel of the Nilgiri species. The two together form a well marked section of the genus, characterized by a circular mouth and smooth whorls.

No. 2.—*Alycæus Footei*, n. s. Pl. 1. fig. 3.

Testa aperte umbilicata, depressa, solida, ad anfractos intenos striata, ad ultimum costulato-striata, ad spatium inflatum crebre costulata ; spira vix elevata, apice obtusula ; sutura parum impressa. Anfr. 4 convexi ; ultimus ad latus mediocriter gibbosus, deinde constrictus, prope aperturam descendens ; spatium constrictum longum,

\* *Cyclotus filocinctus*, Bens. and *C. Malabaricus*, Blanf.

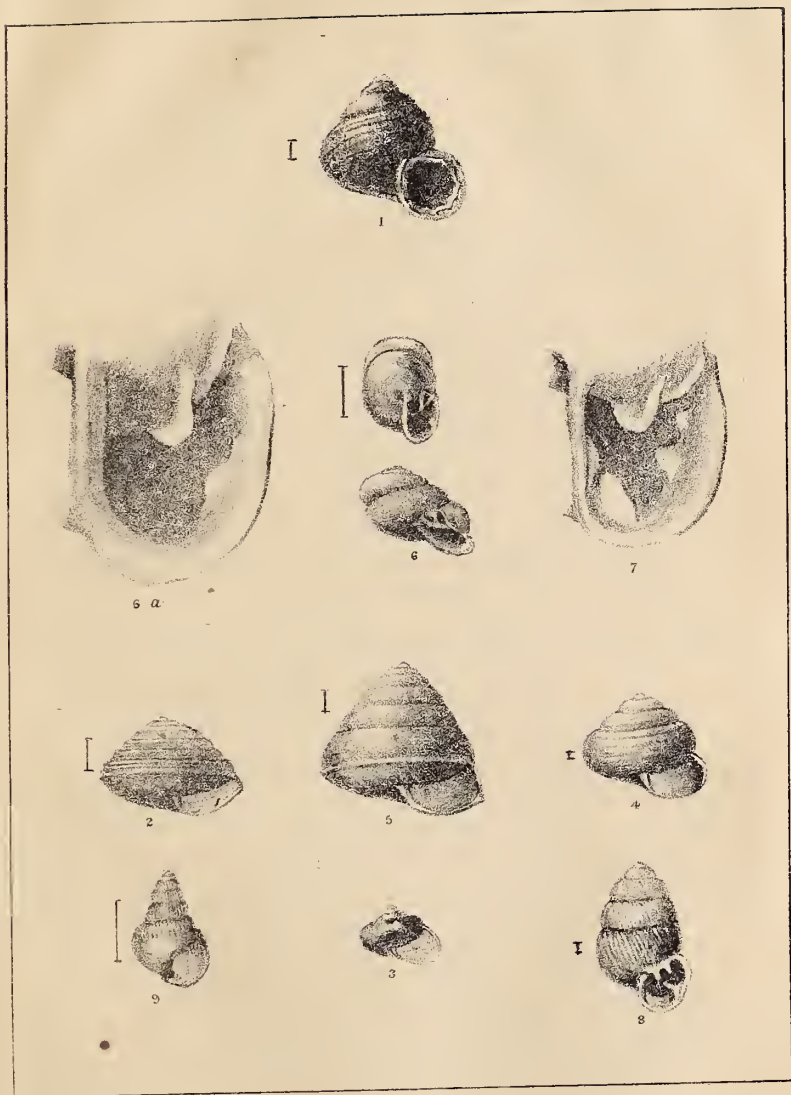
† *Cyclostoma trochlea*, Bens. ; the operculum is peculiar ; double and externally calcareous.



H.F. Blanford, del.

LITH. BY H.M. SMITH, SURV. GENL'S OFFICE, CALCUTTA, 1861.





H.F. Blanford, del.

LITH: BY H.M. SMITH, SURV: GENL'S: OFFICE, CALCUTTA, 1861.





medio tumidum, striatum, eostam validem retro recumbentem; peristomatis marginem dextrum ad basin attingentem, gerens; tubulus sutaralis juxta constrictionem oriens, mediocris,  $\frac{1}{2}$  peripheriæ subæquans. Apertura perobliqua, circularis, undata; perist. duplex; interno breviter porrecto, continuo; externo late expanso. Opere.?

Diam. maj. 6, min.  $4\frac{1}{2}$ , Alt. 3, Ap. Diam.  $1\frac{3}{4}$  mm.

vel „ 0.24 „ 0.18 „ 0.12 „ 0.07 unc.

Habitat in montibus Kolamullies dietis: teste W. King.

This shell is nearly allied to *A. Expatriatus*, Blanf. of the Nilgiris, but distinguished principally by the possession of a recurved ridge upon the constriction, somewhat similar to that in *A. hebes*, Bens. and *A. gemmula*, Bens. Other differences are, the flatter suture and more oblique mouth, caused by the greater descent of the last whorl in *A. Footei*, while the swelling at the side of the last whorl is somewhat greater, and the constriction more marked.

From *A. hebes* and *A. gemmula*, the present species is easily distinguishable by its flat spire, besides other characters of sculpture, &c. The ridge on the constriction in *A. Footei* lies back on the top of the whorl, and meets the peristome at the base of the right margin: in the other two species, the ridge is more at the side, and meets the peristome at the bottom.

All the specimens sent are somewhat weathered.

A variety of *A. expatriatus*, Blanf. was also obtained by Mr. King from the Shevroys, a group of hills about 40 miles N. of the Kolamullies. It only differs from the Nilgiri form in size, measuring in its two diameters  $5\frac{1}{2}$  and  $4\frac{1}{2}$  mm. instead of  $4\frac{1}{2}$  and  $3\frac{3}{4}$ . It is curious thus to find the same species on two hill-groups separated from each other by at least 100 miles, while a distinct species occurs on a third small table land but 30 miles from one of the others.

No. 3.—*Cyclophorus malleatus*, n. s. Pl. 1. fig. 4.

Testa anguste umbilicata, trochiformis, oblique striata, liris spiralibus supra et infra cincta, solidiuscula, epidermide fuscâ induta, sub epidermide albida; spira conica, apice acuta, sutura impressa. Auf. 5 convexi; ultimus rotundatus in veteribus exemplis descendens et fere solutus. Apertura parum obliqua, circularis, superne subangulata; perist-rectum, simplex, breviter adnatum, margine columellari recedente, dextro supra antice porrecto. Opere.?

Diam. maj.  $6\frac{1}{2}$ , min.  $5\frac{1}{2}$ , axis  $6\frac{1}{2}$ , ap. diam. 3 mm.

or „ 0.26 „ 0.22 „ 0.26 „ 0.12 unc.

Habitat in montibus Shevroys; teste W. King.

This appears to be a representative of the Cingalese group, comprising *Cyclophorus halophilus*, B. *C. orophilus*, B. *C. flammens*, Pfr. &c. It differs from all except *C. orophilus* and *C. conulus* in being spirally lirate, and from these two in several characters of spire, aperture, epidermis, &c.\*

Some specimens of the same or of a closely allied species were found by one of us in Neddiwuttom Ghat on the Nilgiris. They were, however, much smaller, the largest specimen procured, only measuring in its 2 diameters,  $4\frac{1}{2}$  and 4 mm. axis  $4\frac{1}{2}$ . A specimen of the same small form also occurs in Mr. Foote's collection from the Kalryenmullies.

All the small conical species of *Cyclophorus* with thin peristomes are classed by Dr. Pfeiffer under *Leptopoma*,† a conclusion with which we cannot agree, for if they are removed from *Cyclophorus*, we are unable to perceive why *C. caeloconus*, Bens. should remain in that genus. *C. malleatus* and *C. halophilus* at least, and probably others, not only resemble *C. caeloconus* in every essential character of the shell, (except in having a slightly more elevated spire,) but they have the peculiar character in common with it, of the last whorl in aged shells,‡ descending irregularly near the aperture, so rapidly, that in some specimens the last part of the whorl is nearly solute. This is especially seen in *C. caeloconus*, B. But if *C. caeloconus* be also classed with *Leptopoma* why not *C. ravidus*, B; a depressed form utterly distinct in generic character from the typical *Leptopomas* of S. Eastern Asia and the Asiatic Islands. The *halophilus* group is classed by Benson under *Cyclophorus*.

A few immature specimens of a depressed *Cyclophorus* from the Kolamullies probably belong to *C. ravidus*, B.

A shell not distinguishable from *C. caeloconus*, B. abounds in parts of the low country in the neighbourhood of Trichinopoly, and especi-

\* We judge so from the descriptions, as we have not specimens of the shells for comparison.

† Monographia Pneumonopomorum, vid. p. 120 and supp. pp. 76, 77.

‡ These shells appear to increase slowly after they have arrived at a stage of growth at which they may be considered as adult, as is the case also with some *Helices* and other mollusks.

ally at the village of Cullygoody where it was found abundantly in piles of stones (limestone), together with *Helix Semifusca* Desh. and another species, *C. involvulus*, Mull., was found by Mr. King at Verdachellum and elsewhere.

A solitary specimen of *Pterocyclos bilabiatus* had been obtained by us from the Kolamullies before Mr. King's specimens were collected. It is of the same variety as that originally described, and has a nearly flat spire. The variety from the foot of the Nilgiris, and which occurs, by no means rarely, at the foot of the Coonoor Ghat, shews several distinctions, the spire being considerably elevated (depressly subturbinata) and the wing and undulations of the peristome much more largely developed. The epidermis also is thinner. In the absence, however, of a series, we are not certain that the species are distinct.

No. 4.—*Jerdonia?* *Kolamulliense*, n. s. Pl. I. fig. 4.

Testa aperte umbilicata, depresso-turbinata, albido-cornea, transverse striata, rubeola; spira conoidea, apice acutiuscula, sutura impressa. Anfr. 4 convexi, ultimus rotundatus, costis 5 filiformibus circumdatus, aliis 7 crebris, striis verticalibus decussatis, in umbilico ornatus, quarum ima ad marginem basalem angulatam umbilici carinam præstat. Apertura circularis, obliqua; perist. rectum, simplex, continuum, superne ed at latus dextrum valde antice porrectum, margine columellari recedente. Umbilicum perspectivum, conicum. Operc. ?

Diam. maj.  $2\frac{2}{3}$ , min.  $2\frac{1}{3}$ , Axis 2, Ap. diam. 1 mm.  
vel „ 0.10 „ 0.09 „ 0.08 „ 0.04 unc.

Habitat in montibus Kolamullies; teste W. King.

Only 4 specimens of this very singular species were found by Mr. King, and of these but one was in fresh condition, while three were imperfect. In the absence of the operculum, it is difficult to decide upon its generic affinities: in many of its characters however and especially in the spiral costulation, the horny texture, the shape of the mouth generally, and that of the umbilicus with its basal keel, it so closely resembles the more turritid *C. trochlea*, Bens. from the Nilgiris, that we have little hesitation in referring it to the same group, which we propose to separate as a subgenus under the name of *Jerdonia*.\*

\* *C. trochlea* is classed by Dr. Pfeiffer as a *Cyclostomus*. As we have since obtained the operculum, which is peculiar but many-whorled and concentric,

The sculpture within the umbilicus recalls that of *Cyathopoma filocinctum*, B.

No. 5.—*Cyclotus Kalryenensis*, n. s. Pl. II. fig. 1.

Testa umbilicata, elevato—conica, albida, spiraliter lirata, epidermide pallide corneâ, induta; spira conica, apice subacuta; sutura profunda: anfr. 5 rotundati: ultimus cylindraceus. Apertura parum obliqua circularis: peristoma duplex, externum expansum, internum porrectum labio dextro crenulato, acutum, continuum: umbilicus perspectivus. Operculum concavum externe testaceum, aufractuum marginibus lamella spirali, ad anfractus externos elevatâ, incurvata, munitis.

Alt. .... 2 mm.

Diam. maj ..... 2,5 ditto.

Diam. min. .... 2 ditto.

Apert. diam. .... 0,8 ditto.

Hab. apud summos montes Kalryen, Ind. Mer.

This is a third form of the little group, endemic to the hills of S. India, of which *Cyc. malabaricus*, Blanf. and *Cyc. filocinctus*, Benson are the other members. It is most closely allied to the latter, from which it differs in its much smaller size and its more elevated spire. The only specimen which retains its operculum is considerably weathered, so that it is doubtful whether the lamellæ of this appendage have not been in some measure destroyed. If not, the species is characterised by the farther difference, that the lamellæ are lower, and less cyathiform than in either of its nearest cogeuers. All the specimens having lost the greater part of their epidermis, we are unable to say whether this be hirsute as in *Cyc. filocinctus*.

No. 6.—*Helix bilirata*, n. s. Pl. I. fig. 7.

Testa perforata, globosa turbinata, solidiuscula, cornea, transverse striata; spira conoidea, apice obtusula Anfr. 7 angusti, sensim accrescentes; superiores carinâ unâ supramedianâ muviti, ultimus ad peripheriam acute bicarinatus, subtus tumidus. Apertura subverticalis, augulato lunaris, perist. rectum, marginibus distantibus, columellari brevi, verticali, reflexo.

Diam. maj. 6, min. 5, axis  $4\frac{1}{2}$  mm.

vel „ 0.24 „ 0.20 „ 0.18 unc.

Hab. in montibus Shevroys et Kolamullies; teste W. King.

we are enabled to correct this, and to shew that its relations are with the *Cyclophorus* group of operculated land shells.

This species apparently approaches the Ceylonese *H. mononema*, B. in character, but differs in its rounded base and less elevated spire.

No. 7.—*Helix Todarum*, n. s. Pl. I. fig. 8.

Testa perforata, subdepressa, fulvo-cornea, tenuis, nitida striata; spira depresso conica, apice acuta. Afr.  $5\frac{1}{2}$  sub-planulati, sensim accrescentes, ultimus haud descendens, subtus convexus, radiato-striatulus. Apertura vix obliqua, late lunaris: peristoma rectum, tenue, margine columellari breviter reflexo.

Diam. major 14, min. 12. Alt. 8 mm. Apertura 6 mm. alta, 7 lata.  
vel „ 0.52 „ 0.48 „ 0.32 „ 0.24 „ 0.28 unc.

Hab. prope Pykara et Neddiwuttom, in montibus Nilgiris.

Near *H. Perrotteti*, Pfr. from which shell, however, the present appears to be distinguished by its higher spire and larger size. It, however, differs somewhat in measurement, and *H. Perrotteti*, also probably varies in size, as some specimens obtained upon the Nilgiris and apparently belonging to that species, measure, in their diameters, 13 and 11 mm. and 7 in height.

*H. Perrotteti* is also included in Messrs. King and Foote's collection, but it is smaller than the type, and measures only 6 and 5 mm. in its diameters, axis 3 mm.

No. 8.—*Helix mucosa*, n. s. Pl. I. fig. 9. Pl. II. fig. 3.

Testa imperforata, conoideo-globosa, tenuissima, pallide interdum subviride luteo-cornea, oblique striata; spira breviter conoidea, apice acutiuseula, sutura marginata. Anfr. 4-5 convexiusculi, rapide accrescentes, ultimus major, non descendens, subtus convexus, ad peripheriam subcompressus. Apertura magna, obliqua, latè lunaris; peristoma rectum, tenue, margine columellari brevissime appresso reflexo, perforationem claudente.

Diam. maj.  $9\frac{1}{2}$ , min. 8. Alt. 6 mm. Ap. 5 lata 4 alta.  
vel „ 0.38 „ 0.32 „ 0.24 „ 0.2 „ 0.16 unc.

Habitat haud raro in montibus "Nilgiris," prope Pykara, ad Coonoor Ghat, et ad Seegoor Ghat.

This shell appears to be allied to *H. Acalles*, Pfr. with which we have not met, but differs in the absence of both perforation and earination. It recalls somewhat in its general shape the Burmese *H. honesta*, Gould, from which, however, it is markedly distinct in size colour, sculpture, perforation, &c.



The above is the measurement of a very large specimen: in the majority the larger diameter does not exceed 8 to  $8\frac{1}{2}$  mm.

Were it not for the characters of the animal, some doubt might arise as to whether this species should not be referred to *Vitrina*. The characters, however, of the mollusk are decidedly Helicoid, but peculiar. The posterior portion of the foot is long, tapering and abruptly truncated at the end, where it carries a mucus pore, partly covered above by a small projecting lobe. The colour of the body is greenish yellow, the edges of the foot being reddish brown, and the centre of the bark pure yellow.

*H. mucosa* is tolerably common at the edges of sholas, and crawling on the sides of stones in jungle, and was found in especial abundance at the side of the road leading down the Seegoor pass, where it is accompanied by *Cyathopoma filocinctum*, B. and *Helix fastigiata*, Hutt.

Mr. Foote has lately sent us a variety of this shell from the Kalryen group of hills (to the East of the Shevroys), which differs from the Nilgiri specimens, in having a more distended mouth and somewhat more depressed whorls. It is figured at Pl. II. fig. 3 and its dimensions are as follow:—

|                      |            |
|----------------------|------------|
| Height, .....        | 7 mm.      |
| Major diam.....      | 10 ditto.  |
| Minor „ .....        | 7.5 ditto. |
| Height of apert..... | 5 ditto.   |

No. 9.—*H. Euomphalus*, n. s.\*

Testa mediocriter umbilicata, subturbinata, depressa, fulvo-cornea, tenuis, oblique striata; spira conoidea, apice obtusa, sutura valde impressa. Anfr. 4 rotundati, sensim accrescentes, ultimus vix descendens, subteres. Apertura obliqua, rotundato lunaris; peristoma simplex, rectum, marginibus distantibus, sinistro haud reflexo. Umbilicium perspectivum.

Diam. maj. 2 lin.  $1\frac{3}{4}$ , alt. 1 mm.  
vel „ 0.08 „ 0.07 „ 0.04 unc.

Hab. rarissime prope Pykara montium Nilgiris. This shell in its form somewhat resembles a minute *H. tapcina*, Bens. with more rounded whorls, deeper sutures, and a non-expanded lip.

\* No figure is given of this shell, as the specimen forwarded by my brother for that purpose, was unfortunately crushed before it reached me.—H. F. B.

No. 10.—*Helix tricarinata*, n. s. Pl. I. fig. 10.

Testa aperte perforata, depresso turbinata, tenuis, pallide cornea, oblique striatula, subtus obsolete decussata. Spira conoidea, apice planulata, perobtusâ, sutura impressa. Anfr. 4 convexi, superne carinis duobus filiformibus cincti; ultimus tribus medianis, non descendens, subtus rotundatus. Apertura subverticalis, rotundato-lunaris; peristoma rectum, acutum, marginibus distantibus, sinistro non reflexo.

Diam.  $1\frac{2}{3}$  Alt. 1 mm.

vel „ 0.06 „ 0.04 unc.

Hab. prope Pykara ad summos montes Nilgiris.

Distinguished from its cogeners by the possession of three spiral ridges at the periphery of the last whorl, besides other characters.

No. 11.—*Helix tertiana*, n. s. Pl. I. fig. 11.

Testa perforata, depresso turbinata, tenuis, pallide cornea, striatula; spira conoidea, apice obtusa, sutura impressa. Anfr. 6 angusti, convexi, ultimus haud descendens, subtus rotundatus. Apertura subverticalis, rotundato lunaris; peristoma simplex, marginibus distantibus, columellari reflexiusculo.

Diam. maj.  $2\frac{1}{2}$ , min.  $2\frac{1}{4}$ , Alt.  $1\frac{3}{4}$  mm.

vel „ 0.1 „ 0.09 „ 0.07 unc.

Hab. raro ad Pykara: necnon ad Neddiwuttom in montibus Nilgiris.

The above 3 species have some similarity in general characters, although well distinguished from each other. *H. tertiana* being distinguished by its higher spire, narrow perforation, and more numerous and closely wound whorls. *H. bullula*, Hutt. and *H. humilis*, Hutt. of the Western Himalayas, together with some small Cingalese Helices appear to belong to the same group. All three of the above species occurred at the edges of sholas, in company with *Jerdonia trochlea*, B. sp. *Diplommantina Nilgirica*, Blauf. and *Cyathopoma Malabaricum*, Blauf.

No. 12.—*Helix aspirans*, n. s. Pl. I. fig. 12.

Testa vix perforata, elevata, pyramidalis, vix striatula, tenuis, cornea. Spira turrita, apice obtusa, sutura parum profunda. Anfr. 7 convexiusculi, lente crescentes, ultimus non descendens, basi convexus, carinâ obtusâ, prope aperturam evanescente, circumdatus. Apertura subverticalis, tranverse lunato, semicircularis; peristoma

tenuē, reetum, marginibus distantibus, columellari breviter reflexiusculo.

Diam. 2, Alt. 3 mm.

vel „ 0.08 „ 0.12 unc.

Habitat raro prope Pykara.

This shell has some characters in common with *H. fastigiata*, Hutt. of the Western, and *H. Barrackporensis*, Pfr. of the Eastern Himalaya, but differs from both in its much more elevated spire which is peculiar and very characteristic. It is a rare form and only one perfect specimen was met with.

We are informed by Mr. Benson that he received a shell undistinguishable from *H. fastigiata*, Hutt. from the Nilgiris. A shell closely resembling the Himalayan species and possibly identical, was found by us in both the Seegoor and Neddiwuttom passes, and in the former place, was not rare.

No. 13.—*Helix injussa*, n. s. Pl. I. fig. 13.

Testa vix perforata, trochiformis, pertenuis, pallido-earnea, superne peroblique, infra radiatim striata; spira conica, apice acutiuscula. Anfr.  $5\frac{1}{2}$  vix convexiusculi, ultimus non descendens, subtus tumidus, ad peripheriam angulatus, angulo antice evanescente. Apertura obliqua, transverse rotundato-lunaris: peristoma simplex, acutum, margine columellari subverticali, superne brevissime reflexo.

Diam. maj.  $3\frac{1}{4}$ , min. 3, Alt.  $3\frac{1}{4}$  mm.

vel „ 0.13 „ 0.12 „ 0.13 unc.

Hab. raro in Coonoor Ghat, montium Nilgiri.

The Sikkim and Landour *H. rimicola*, Bens.\* is the nearest form to *H. injussa* with which we are acquainted. The Nilgiri shell has a higher spire, and is considerably smaller in size. From the comparatively large *H. infula*, Bens. *H. injussa* may be easily distinguished by the absence of the peculiar sculpture of that species, as well as by its fewer whorls† and smaller size.

No. 14.—*Helix daghoba*, n. s. Pl. II. fig. 2.

Testa auguste perforata, depresso conoidea, oblique striata spiraliter sulcata, earinata, suturæ impressæ. Anfr. 7-8 lente accrescentes

\* Ann. and Mag. Nat. Hist. for April, 1859.

† All the full grown specimens of *H. infula* which we possess have 7 whorls. This shell is tolerably abundant on Banyan trees (*Ficus indica*) in the Botanical Gardens, Calcutta. We have also met with it in Orissa.

subconvexi, ultimus non descendens valde carinatus, infra convexus, lævis, ad umbilicum vix impressus. Apertura subrecta, depressa sucuiformis. Peristoma acutum ad umbilicum reflexum, intus 2 dentibus palatalibus munitum.

|                  |            |
|------------------|------------|
| Alt. ....        | 3 mm.      |
| Diam. maj. ....  | 6 ditto.   |
| „ min, ....      | 5,3 ditto. |
| Apert. alt. .... | 1,6 ditto. |

Habitat in montibus Patchamullies et Kalryenmullies, Ind. Mer. Teste R. B. Foote.

This shell is nearly allied to *H. retifera*, Pfr. which it resembles in form and the spiral sculpture. It is distinguished from that species by its minute umbilicus and by the form, number and position of the internal teeth, which in *H. daghoba* are small and compressed, but not lamelliform, and are situated very near the edge of the peristome. The specimens received from Mr. Foote are all bleached, and we are unable to say whether the living shell is covered with a hairy epidermis like *H. retifera*.

No. 15.—*Helix febrilis*, n. s. Pl. II. fig. 4.

Testa angustissime perforata, globoso-turbinata, spiralliter lirata. Spira subelevata, convexa, apice obtusâ, suturis valde impressis. Anfr.  $4\frac{1}{2}$  convexi : ultimus non descendens, ad perpheriam subdepressus infra planate rotundatus, lævis. Apertura obliqua, oblonga. Peristoma rectum, acutum, ad basin expansiusculum, columellari breviter reflexo, marginibus remotis.

|                 |            |
|-----------------|------------|
| Alt. ....       | 1,25 mm.   |
| Diam. maj. .... | 1,5 ditto. |
| „ min. ....     | 1,3 ditto. |
| Apert. alt..... | 0,6 ditto. |

Habitat apud montes Kalryenmullies, Ind. Mer. Teste R. Bruce Foote.

This species bears a general resemblance to *H. tricarinata* above described, but is readily distinguishable by its higher spire, the absence of the characteristic triple carination, and the flatness of its basal surface. The two specimens received from Mr. Foote are both much weathered, and have lost their colour and much of the sharpness of their ornament.

No. 16.—*Helix lychnia*, Benson.

A shell, undistinguishable from the species above quoted, was found by one of us, wedged in the bark of a tree, in a shola between Pykara and Seegoor on the Nilgiris. This may appear surprising, as the original specimens were obtained by Dr. Bacon from Singapore, and the species has not, we believe, been met with in any part of the vast area extending between these distant localities. We can however furnish a parallel instance of equally wide range, in the case of the nearly allied shell *H. castra*, Benson, which has been found in Tenasserim, the Khasia Hills, Sikkim, the hills of Balasore in Orissa, and quite lately by one of ourselves in the neighbourhood of Kandy in Ceylon.

No. 17.—*Helix Barrakporensis*, Pfr. Pl. II. fig. 5.

In a former paper, we noticed the discovery by one of ourselves of *H. Huttoni*, Pfr. in the Nilgiri hills, we have above mentioned the further occurrence of *H. castra*, Benson, *H. fastigiata*, Hutton and *H. lychnia*, Benson, the former in Ceylon, the latter in the Nilgiris, as instances of hill shells common to both sides of the great Gangetic valley. A fifth species is *H. Barrakporensis*, Pfr., which we have lately received from Mr. R. Bruce Foote, who found it on the Kalryenmullay group of hills near Salem. The specimen drawn with the camera lucida is figured at Pl. II. fig. 5.

No. 18.—*Streptaxis Footei*, n. s.?

vel *Str. Perotteti*, var. *Footei*? Pl. II. figs. 6, 6 a.

Testa anguste umbilicata, depresso pyriformis, tenuiuscula, glabra, cereo-albida; depressissime-conoidea apice laterali. Sutura submarginata. Anfr.  $5\frac{1}{2}$  convexiusculi, penultimus latere dextro inflatus, ultimus latere sinistro, infra planatus, pone peristoma subtus constrictus medio indentatus. Apertura oblonga, perobliqua: paries aperturalis lamellis 2 subparallelibus, mediana intrante munitus: peristoma tenue, expansum, reflexum, margine dextro valde sinuato, intus 1-dentato.

|                  |       |
|------------------|-------|
| Alt.....         | 5 mm. |
| Diam. maj. ....  | 6 „   |
| Apert. alt. .... | 3 „   |

Hab. apud Shoolamullay, montium Patchamullay, Ind. Mer. ad alt. 3000 ped. Teste R. B. Foote.



It is difficult to say whether this little shell should be regarded as a distinct species, of the same group as *Str. Perotteti*. Petit, and *Str. Watsoni*, nob. or whether the three should be considered as varieties of the same species. The differences between such specimens of the three forms as we have obtained are indeed sufficiently striking, and such as are usually treated as indications of specific distinction. While the typical *Str. Perotteti*, has the peristome furnished with 3 teeth and *Str. Watsoni* with from 3 to 5, one of the specimens of *Str. Footei* received from Mr. Foote possesses but one tooth, viz. on the outer lip, while another, a distorted shell, has 2 palatal teeth. The latter species is moreover smaller than the first mentioned and larger than the second. On the other hand, it is clear that the number and development of the teeth alone cannot be regarded with certainty as a specific character, for we find that both *Str. Perotteti* and *Str. Watsoni* vary to some extent in this respect as well as that before us. Several minor differences which are perceptible when single specimens of the three *Streptaxes* are compared, are found to vary in shells undoubtedly of the same species, such as the size of the umbilicus, the depth of the sutural notch in the peristome, the striation of the whorls, &c. On the whole we think it more probable that the Patchumullay shell is a local variety of *Str. Perotteti* than a distinct species.

No. 19.—*Ennea Salemensis*, n. s. Pl. II. fig. 8.

Testa rimata, ovato-oblonga, oblique striata, fulvida: spira elevata, conoidea, apice obtuso: sutura impressa; Anfr.  $4\frac{1}{2}$ : superiori convexiusculi, inferiori subplanati, ultimus pone aperturam medio excavatus,  $\frac{2}{5}$  longitudinis subequans, antice arcuatim ascendens, juxta suturam et infra compressus. Apertura reniformis: columella recedens superne callosa. Dentes parietales 2 compressi. Peristoma expansum, labio externo flexuose excavato 1 dentato.

Long. .... 1.6 mm.

Diam. maj. .... 1 „

Apert. alt. .... 0.6 „

Hab. apud montes Kalryen, Ind. Mer. Teste R. B. Foote.

This little shell belongs to a type distinct from that of *Ennea Pierrei* and the other S. Indian species, and is more nearly allied to the Cuttack sp. *E. seriola*. From this it is distinguished by its more conoidal form and the possession of two well developed parietal, and

one palatal tooth, whereas the Cuttack shell has but one minute parietal tooth. Moreover, the mouth is smaller and more constricted. Two specimens were received from Mr. Foote, both somewhat weathered.

No. 20.—*Bulimus prætermisus*, n. s.

Testa perforata, oblongo conica, tenuis, nitida, striata, lutea albida, varie rufo vel fuseo spiraliter fasciata et transverse strigata, plerumque uni vel trifasciata, interdum unicolor albida. Spira conica, apice acutiuscula plerumque nigra. Anfr. 7 convexiusculi, ultimus  $\frac{2}{5}$  longitudinis subæquans, basi rotundatus. Apertura vix obliqua, subovalis; peristoma simplex, reetum, margine columellari verticali, fornicatim reflexo.

Long. 19, diam. 10, mm. Ap. 8. alta.  $5\frac{1}{2}$  lata.

vel „ 0.76 „ 0.4 unc. „ 0.32 „ 0.22 „

Olim in Orissa, nuper prope Salem inventus.

This species is intermediate between *B. mavortius*, Reeve and *B. punctatus*, Anton, on the one hand, and *B. Bengalensis*, Lam. on the other. It resembles the two first named in form, but differs from both in the absence of the transparent spots on the whorls. It is less solid than *B. mavortius* and broader in proportion to its length than *B. punctatus*. From *B. Bengalensis* it is distinguished by its small mouth, and by less tumidity.

It varies considerably in marking, of which we have the following varieties.

1. Yellowish white throughout; apex the same.
2. Yellowish white with a single brown stripe round the lower portion of the last whorl; apex white.
3. Upper whorls transversely obliquely striped with pale reddish lines; last whorl purplish, with a dark brown stripe round the lower portion. Apex black.
4. Yellowish white, two pale reddish brown lines round the lower portion of the last whorl, the upper running along the suture above. The upper part of the whorls obliquely striped with interrupted streaks of the same colour. Apex black.
5. Three rather broadish and irregular brown stripes around the last whorl; two on the upper ones, becoming purplish black near the apex; apex black.

6. 3 stripes of dark brown on the lower whorl, 2 on the upper ones. Apex black. Similar to the marking in *B. Bengalensis*.

We have no specimens with more than 3 stripes around the last whorl.

7. Whorls obliquely and undulately striped with brown, one stripe round the lower part of the last whorl. Suture near the top purplish black; apex black.

Specimens of *B. prætermisus* were first found by ourselves 5 years ago in the tributary mehals of Cuttack, in Orissa; and were by us long considered as a variety of *B. Bengalensis*. The first six varieties came thence, No. 7. which is rather more highly coloured, occurs amongst the shells sent from S. India by Mr. King, who found it on detached hills, N. E. of Conaniputty, in the Salem district.

No. 21.—*Bulimus orbis*, n. s. Pl. I. fig. 14.

Testa subperforata, oblongo turrata, cornea, tenuis, oblique striatula; spira conica, apice obtusiuscula sutura impressa. Anfr. 7 convexi, ultimus  $\frac{1}{3}$  longitudinis subæquans. Apertura obliqua, rotundato-ovalis; peristoma simplex, rectum, marginibus convergentibus, dextro arcuato, ad anfr. penultimum valde antice porrecto, columellari breviter reflexo, perforationem subtegente.

Long. 10, diam. 5, ap.  $3\frac{1}{4}$ , alta.  $2\frac{1}{2}$  lata.  
vel „ 0.40 „ 0.20 unc. 0.13 „ 0.10 ditto.

Hab. ad Cullygoody prope urbem Trichinopoly, Indiæ meridionalis.

We are not acquainted with any Indian type of *Bulimus* to which the shell can be compared. Its horny texture, elevated, conical spire, and rounded mouth, with the upper margin of the thin peristome running to a considerable distance forward along the penultimate whorl, form a very peculiar combination of characters.

No. 22.—*Spiraxis hebes*, n. s. Pl. I. fig. 15.

Testa imperforata, turrata, cornea, rugoso striata; spira subulata, apice perobtusula, sutura albedo marginata. Anfr. 7 parum convexi, ultimus  $\frac{1}{3}$  longitudinis subæquans, basi rotundatus. Columella parum callosa, vix subtorta, brevis. Apertura fere verticalis, elongato ovalis; peristoma simplex, rectum, margine dextro superne arcuato.

Long. 15, diam. 4 mm. ap.  $4\frac{1}{2}$  alta. 2 lata.  
vel „ 0.60 „ 0.16 unc. „ 0.18 „ 0.08.

Hab. in montibus Nilgiris.

The above are the dimensions of the largest specimen found. It is however possible that this shell may attain a greater size. The sole Indian species to which it appears to be related is *Sp. (Bul.) gracilis*, Hutt, from which, however, it may be easily distinguished by its very obtuse apex, less numerous whorls, &c.

No. 23.—*Achatina paupercula*, n. s. Pl. I. fig. 16.

Testa turrito-oblonga, solidula, nitidula, fulvo cornea, impresso-striata; spira turrita, lateribus vix convexis, apice obtusa, sutura sub-marginata, Anfr. 7, parum convexi, ultimus  $\frac{1}{3}$  longitudinis sub-æquans. Columella valde arcuata, basi antice truncata. Apertura ovali-pyriformis; peristoma rectum, iutus vix labiatum, marginibus callo junctis.

Long. 9 diam.  $3\frac{1}{2}$  mm. ap. 3 alta. 2 lata.

or „ 0.36 „ 0.14 unc. 0.12 „ 0.08 „

Hab. in montibus Kolamullies, Patchamullies et Shevroys, teste W. King et R. B. Foote.

The nearest ally to this small species appears to be the Darjiling *A. crassula*, B. From this it is mainly distinguished by the shape of the spire which is more convex at the side, by its smaller breadth compared with its length, and by its more marked and slightly marginate sutures.

*A. paupercula* is probably common upon the Shevroys. All the specimens however found by Mr. King at that locality are bleached, two specimens from the Kolamullies alone retaining their original texture.

No. 24.—*Achatina Tamulica*, n. s.

Testa turrita, tenuis, pellucida, nitida, cornea, striatula; spira regulariter attenuata, apice obtusa; Anfr. 10 convexi, ultimus  $\frac{1}{4}$  longitudinis paulo superans, rotundatus; columella valde arcuata, oblique truncata. Apertura parum obliqua, subovalis; peristoma simplex, tenue, marginibus callo tenuissimo junctis.

Long. 20, diam. 6 mm. Ap.  $5\frac{1}{2}$  alta. 3 lata.

vel „ 0.8 „ 0.24 unc. „ 0.22 „ 0.12 „

Hab. prope Trichinopoly ad Cullagoody, &c.

Near *A. Shipleyi*, Pfr. but distinguished by the smaller number of whorls, more obtuse apex, &c.

No. 25.—*Achatina Mullorum*, Pl. I. fig. 17.

Testa turrito-oblonga, solidiuscula, pallide cornea, diaphana, subre-

mote leviter striata; spira turrita, apice obtusa, sutura impressa. Anfr. 6 convexi, ultimus  $\frac{1}{3}$  longitudinis subæquans, basi rotundatus. Columella brevis, arcuata, vix callosa, oblique truncata. Apertura fere simicircularis, verticalis; peristoma rectum, obtusum, marginibus callo tenui junctis.

Long.  $7\frac{1}{2}$ , diam. vix 4 mm. ap.  $2\frac{1}{2}$  alta.  $1\frac{3}{4}$  lata.  
 vel „ 0.3 „ 0.16 unc. „ 0.1 „ 0.07 „

Habitat ad urbem Madras.

Var *a* Anfractus ultimus nitidior, tumidior.

This is one of the group of small Indian *Achatinas* comprising *A. gemma*, Bens. and *A. scrutillus*, B. From these two shells the present species is distinguished by its conical spire with straight and not convex sides, its paler colour and sculpture. Both varieties were found abundantly crawling on banks, in a garden at Nungumbankum, a suburb of Madras.

An *Achatina* distinct from any of the above and probably new is figured at Pl. II. fig. 9. Two specimens of this shell were received from Mr. Foote, who found it on the Kalryenmullies. It is characterised by a strong oblique costulation on the upper part of the whorls, the lower part being smooth. Like most of its associates it is thin, and of a pale horny brown. We refrain from naming it being doubtful whether it be a full grown shell, though both the specimens received are of the same size and form.

The complete list of species, from the Kolamullay, Patchamullay, Kalryenmullay and Shevroy hills respectively, contained in Messrs. King and Foote's collections is the following. Those marked with an *N* occur also in the Nilgiris.

#### 1.—*Kolamullay Hills.*

*Cyclophorus ravidus* ? B. *N*.

\**Pteroryclos bilabiat*us, var. Sow, *N*.

*Alycæus Footei*, n. s.

*Cyclostoma* (*Jerdonia* ?) *Kolamulliense*, n. s.

*Diplommatina Kingiana*, n. s.

*Helix bilirata*, n. s.

*H. Tranquebarica*, Fabr, var. (*N*. ?)

*H. Maderaspatana*, Gray. *N*.

\* Obtained by ourselves but not included in the collection from this locality.



*H. Semifusea*, Desh.  
*H. Perrotteti*, Pfr. *N*.  
*Achatina paupereula*, n. s.  
*Ennea Pirriei*, Pfr. *N*.

2.—*Patchamully Hills.*

*Helix daghoba*, n. s.  
*H. Perotteti*, Pfr. *N*.  
*Streptaxis Perotteti*, Pfr. var. *Footci*, nob.  
*Achatina paupereula*, n. s.  
*A. Shiplayi*, Pfr. *N*.  
*Cyclophorus involvulus* ? or *Cyc. Jerdoni*. (Young shell.)  
*Pterocyclos bilabiatus*. Sow. *N*.

3.—*Kalryenmullay Hills.*

*Cyclophorus malleatus* ? n. s. *N*.  
*Cyclotus Kalryenensis*, n. s.  
*Pterocyclos bilabiatus*, Sow. *N*.  
*Helix daghoba*, n. s.  
*H. mucosa*, n. s. *N*.  
*H. Perotteti*, Pfr. *N*.  
*H. Barrakporensis*, Bens.  
*H. febrilis*, n. s.  
*Ennea Salemensis*, n. s.  
*Achatina Shiplayi*, Pfr. *N*.  
*Achatina*, n. s. ?

4.—*Shevroy Hills.*

*Cyclophorus malleatus*, n. s. *N*.  
*Alycæus Expatriatus*, Blanf. var. *N*.  
*Helix retifera*, Pfr. *N*.  
*H. maderaspatana*, Gray. *N*.  
*A. paupereula*, n. s.  
*Ennea Pirriei*, Pfr. *N*.

It is probable that some other species occur in all the ranges, or we should be obliged to conclude that as a rule, each has fewer species in common with the other, at a distance of not more than 30 or 40 miles, than with the Nilgiris at from 90 to 120 miles distance ; as is shown by the following table :—

|                         | Nilg. | Kolam. | Patch. | Kalr. | Shev. |
|-------------------------|-------|--------|--------|-------|-------|
| Nilgiri Hills, .....    | —     | 6      | 3      | 5     | 6     |
| Kolamullay Hills, ..... | 6     | —      | 3      | —     | 3     |
| Patchamullay Hills, ... | 3     | 3      | —      | 4     | 1     |
| Kalryenmullay Hills, .. | 5     | 2      | 4      | —     | 1?    |
| Shevroy Hills,.....     | 6     | 3      | 1      | 1?    | —     |

The most interesting circumstance connected with these collections, is the evidence they afford of an uniform fauna, (though with some slight specific distinctions, as in the case of *Alycaeus*, *Diplommatina*, *Cyclotus*, *Streptaxis* &c.) upon the higher portions of the various detached groups of hills with more or less flat tops, which are scattered over the plains of Southern India. So much is this the case, that we have found *H. Nilagrica*, Pfr. and *H. Maderaspatana*,\* Gray near Chettycolum, N. of Trichinopoly, upon the upper portion of a detached peak, which cannot be above 1500 feet in height.

It is not at all probable these shells, all inhabitants of a comparatively moist and cool climate, should have been able to cross the hot dry plains which at present extend between the several groups of hills. But as all geological evidence clearly proves the comparatively recent elevation of the plains of the Indian peninsula, we can readily conceive, that in a recent geological epoch the whole of them were under water, and the occasional migration of living specimens on floating wood from island to island may easily have taken place in the manner suggested by Darwin: [On the origin of species, p. 397,] or we may suppose that, moisture being more influential in determining the range of the pulmoniferous mollusca than slight differences of temperature, and the elevation of the country having been extremely slow, those portions of the low country which were first elevated above the sea, enjoyed for a time a moister climate than obtains, now that a wide extent of country intervenes between the opposite coasts: and thus that migration took place across these tracts, the

\* *H. maderaspatana* is stated in Pfeiffer's Mon. Helic, vol. i. p. 63, to occur around Pondicherry, Maderaspatam (a locality perhaps somewhat more widely known as Madras,) and Mangalore. It may occur on the Western Ghats in the vicinity of the last named town, but we do not hesitate to express our disbelief in its occurrence within 60 miles of either Madras or Pondicherry. The shell is probably common to all the high table lands and hill groups of Southern India, and occurs on the Nilgiris, in Mysore, the Wynnad and probably along the Western Ghats.

migrated species being subsequently driven to their actual isolated stations by the progress of upheaval.

It would appear furthermore that a certain interchange of species must have taken place, either immediately by transport across the sea area, or slowly and mediately across the plains, with areas far more distant than the Nilgiris. We have given 4 examples of hill shells known to be common to Ceylon or S. India and the Himalaya, the Khasia Hills, and even the Tenasserim Provinces and Singapore, ranges the more striking when we consider how few species are common to the Nilgiri Hills and those of Ceylon.

#### PLATE I.

Fig. 1. *Diplommantina Nilgirica*, enlarged.

„ 2. „ *Kingiana* „

„ 3. *Alycæus Footei*, „

„ 4. *Jerdonia Kolamulliensis*, „

„ 5. Operculum of *Jerdonia trochlaea*, „

„ 6. *Cyclophorus malleatus*, „

„ 7. *Helix bilirata*, „

„ 8. *Helix Todarum*, Nat. size.

„ 9. *Helix mucosa*, „ „

„ 10. *Helix tricarinata*, enlarged.

„ 11. *Helix tertiana*, „

„ 12. *Helix aspirans*, „

„ 13. *Helix injussa*, „

„ 14. *Bulimus orbus*, Nat. size.

„ 15. *Spiraxis hebes*, „ „

„ 16. *Achatina paupercula*, enlarged.

„ 17. „ *Mullorum*, Nat. Size.

#### PLATE II.

Fig. 1. *Cyclotus Kalryenensis*, enlarged.

„ 2. *Helix daghoba*, enlarged.

„ 3. „ *mucosa*. Nat. size.

„ 4. „ *febrilis*, enlarged.

„ 5. „ *Barrakporensis*, enlarged.

„ 6. *Streptaxis Perotteti*, var *Footei*, enlarged 2 diam.

„ 6a. „ „ „ „ mouth enlarged.

„ 7. „ *Watsoni*, mouth proportionately enlarged.

„ 8. *Eunea Salemensis*, enlarged.

„ 9. *Achatina* from the Kalryenmullies, enlarged 2 diam.



Sketch Map  
of the  
NORTHERN PORTIONS  
of  
**ASSAM & BURMA**

WITH PART OF  
**CHINA.**  
COMPILED IN THE SURVEYOR GENERAL'S OFFICE TO ACCOMPANY THE  
MEMORANDUM BY THE  
VERY REV<sup>d</sup> T. D. MAZURE  
VICAR APOSTOLIC OF TIBET

SCALE 14 MILES = 1 INCH

*W. G. O. S. P.*  
Surveyor General of India









*Memorandum on the countries between Thibet, Yunán and Burmah.*

—By the VERY REVEREND THOMINE D'MAZURE, *Vicar Apostolic of Thibet*; communicated by Lieut.-Colonel A. P. PHAYRE, *Commissioner of Pegu*; (with notes and a comment by Lt.-Col. H. YULE, *Bengal Engineers*). With a Map of the N. E. FRONTIER prepared in the office of the Survr.-Genl. of India, Calcutta, August, 1861.

The following account of the countries situated between Thibet, the Chinese provinces of Setchuen and Yunán, and the Northern portion of Burmah, is contained in a letter written by the Very Reverend Thomine D'Mazure, Vicar Apostolic of Thibet, residing in the valley of Bonga in about 28° 15' of North Latitude and 96° 30'\* of East Longitude.

The country is under the government of Hlassa. The letter is addressed to the Right Reverend Bishop Bigandet, Bishop and Vicar Apostolic in Pegu and Ava.

The Vicar Apostolic of Thibet considers that the Tsanpo river of that country, or as he writes it, Gakbo-dzanbo,† is the upper course of the Irawadi river. Bishop Bigandet's communication, addressed to Lieutenant-Colonel A. P. Phayre, is as follows.

'Rangoon, 15th September, 1860. I have the pleasure to communicate to you the following remarks on the geographical situation of the countries between Thibet, the Chinese Province of Setchuen and a portion of Yunán and Burmah, as well as on the tribes inhabiting them, which have been supplied, at my request, by the Vicar Apostolic of Thibet. On my return from Bhamo in 1857, I felt very anxious to ascertain whether it would be possible to establish a communication between the Missionaries established in those localities and ourselves. The distance between Bhamo in Burma and the Valley of Bonga where our Missionaries have a small establishment, could not be more, in my estimation, than 4° or 4° 25' of North Latitude, and I wished to be informed as correctly as possible on the geographical position of Bonga, the names of the principal rivers, mountains, and

\* This is probably Paris longitude. Otherwise it is an impossible position. It does not appear whence it is derived. The letter does not mention the supposed longitude of Bonga.—Y.

† This should be "Yarkou dzanbo." The Gakbo he describes as a tributary only of the other.—Y.

tribes of those parts. Agreeably to my demand, the following details have been forwarded to me and received here about three months ago. The letter is dated 9th August, 1859,\* and runs as follows :

“DEAR MONSEIGNEUR.

“I need hardly state that the items of information respecting the position of places are not based on geometrical mensuration, or astronomical observations. They have been collected on the spot from personal observation, and from the reports supplied by natives of various nations and tribes.

I. “Relying upon the Map of Andriveau Goujon, Paris, 1841, the main chain of the Himalaya is supposed to end in the Province called Khana Deba,† by the  $27^{\circ}$  and  $28^{\circ}$  of North Lat. and the  $96^{\circ}\frac{1}{4}$  of (Paris) Long.

II. “From probable, but not positive, calculations that I have made, as well as from the particulars I have been able to collect, the Chinese towns of Longtchang-fou,§ Teniné tehou,|| ought to be placed one degree and a half farther in an eastern direction, and the distance between the Irrawaddy and the Louts Kiang ought to be nearly double that which is indicated on the said Map.¶

III. “On the same map Tsatsorken (in Thibetan Tsarong),\* and the tributary of the Louts Kiang are marked too low in a southern direction. The great bending of the two rivers Louts Kiang and Lantsan Kiang seems to begin above the  $28^{\circ}$  of Latitude. Bonga, our small establishment, is in one of the valleys of the range of mountains that separate those two rivers, near to the left bank of the Louts Kiang, and not far from the beginning of the bending from N. W. to S. E. in about  $28^{\circ} 15'$  N. Lat.

\* Therefore about ten months on the way.—Y.

† Khana Deba is the name given by Wilcox's informants to a Tibetan chief near the sources of the Brahmaputra. It is derived from Wilcox by the French geographers.—Y.

‡ Add  $2^{\circ} 20'$  for Greenwich =  $98^{\circ} 20'$ , which agrees pretty well with Wilcox's Map.

§ Should be Yong-chang-foo probably, but may be Loung-chouan-foo the Mowun of the Burmese.—Y.

|| Theng-ye-choo of the Maps, the Momien of the Burmese.—Y.

¶ The Vicar is doubtless forced to this conclusion by the wrong position given to the Irawadi on his maps. In compiling my map of Burma I was compelled to take an opposite view and to move these places and the Chinese-Burman frontier to the westward. See *Mission to Ava*, pp. 266.—Y.

† Tsatsorgang in Klaproth's map is in Lat.  $30^{\circ} 18'$ , Long. Paris  $95^{\circ} 54'$  = Gr.  $98^{\circ} 14'$ . In D'Anville its latitude is  $28^{\circ} 20'$ . All the latitudes in D'Anville's maps hereabouts are greatly too low, as our knowledge of Assam demonstrates.—Y.

IV. "That country is the south-easternmost limit of the possessions directly subjected to the government of Hlassa. There begins the country called Lokatra by the Thibetans. Lokatra means the *southern tatooed people*. Lokapatra has nearly the same meaning: Kapa means lips.\* This last name which the Rev. Mr. Fage never heard mentioned by the Thibetans may be likewise correct, because some of the wild tribes, both men and women, tatoo the lips and chin so as to resemble a beard. This same country is called Loke Patchan by the Chinese.† South of Bonga the tribe of the Louts is met with, and they occupy all the western country as far as that part of the Himalaya where in the maps the Mishmis are located.

V. "In that extent of territory west of the Louts Kiang at a distance of about 30 miles, is to be met a range of high mountains. On the west of that range, is a river rather inconsiderable called Kouts Kiang or Schété Kiang (both names are used by the Chinese). When it enters the Province of Yunan, it is known under the name of Lountchang Kiang, flows east of Teniné, and joins the Irrawaddy below Bhamo.‡ Between the Kouts Kiang and another considerable river that flows in the Irrawaddy, there are several ranges of mountains, the general direction whereof is from south to north. That river is named in the maps Gakbo Dzanbo. Its course through Thibet appears to be very different from what has hitherto been supposed. Its junction with the Irrawaddy must be placed somewhat more in the south. That§ called by the Chinese Kanpoo-tsangbo, is named by the people of Bonga, Dzain, because it flows through the sub-prefecture of that name. In that district, according to the Thibetans, is

\* This no doubt refers to a passage in Father Giorgi's *Alphabetum Tibetanum*, p. 423, where describing the province of Tak-po which is that to the east of Jigatzé (or Teshoo Loombo of our maps), he says it is bounded on the south by the *Lhokaha-patra* or the "Southern Cut-mouths" "*quod populi hi meridionales labia gerunt incisa.*"—Y.

† Klaproth has got the Hlokba or Hlokabadja north of Burmah near the Irawadi, but probably transferred from the Himalaya far to the west, to meet his theories.—Y.

‡ This must be the Shoay-lee of the Burmese, which empties its water in the Irrawaddy about 55 miles south of Bhamo. On leaving the Province of Yunan the Shoay lee flows through mountainous districts, inhabited by Shans, winds through a very extensive flat country in a south-western direction, and finally joins the great river of Burmah. At its mouth, there is an island upon which is a small village called Shoay-lee-wa-youa.—*Note by Bishop Bigandet.*

§ I have no doubt this should be "*this river*"—i. e. the Gakbo-dzanbo of the maps.—Y.

the village of Samé where our two priests MM. Krick and Bonry were murdered.

VI. "To me there is not the least doubt, that the great river that flows through the whole length of Thibet, marked on the maps Yarou dzanbo, called by the Chinese Ia-lou-tsang-pou, and by the Thibetans, Yar-Kiou-tsangbo, is the Irrawaddy. I believe that its bending must be brought more to the east. This would agree better with the observations made by the English on the tributaries of the Brahmaputra. The latter cannot possibly be the Yar-Kiou-tsangbo.

VII. "Here is the general aspect of this country ; three principal rivers, the Irrawaddy, with its tributary the Kan-pou-kiang, the Kouts-Kiang, and the Louts-Kiang. These rivers are divided or separated by four principal ranges of mountains. The 1st range is formed by the last and easterly range of the Himalaya, west of the Irrawaddy ; the 2nd lies between the Irrawaddy and the Kouts-Kiang ; the 3rd between the Kouts-Kiang and the Louts-Kiang and the 4th between the latter river and the Lantsang-Kiang. The two first ranges appear to lower their heads beyond the 28° of North latitude owing to the great elevation of the soil in Thibet. The only range well known to our priests is the one near their settlement. Two spurs of that range that are north and south of their habitation are called Dokerla and Dokela.\* The latter is visited by innumerable pilgrims from all parts of Thibet, who come to worship the Spirit Kaoua Kerbo, that is to say, the white snow. It takes 7 days of hard travelling, to go from the Louts-kiang, to Kan-pou-kiang, or river of Dzain. The distance in a straight line is very short, but in countries like these, where there is nothing but ascending and descending, the direct distance gone over during one day is very small. East of that extent of territory lies the district called Tsarong, ending at the summit of the chain of the Dokerla, separating the rivers Louts and Lantsang. West of that same district, near to the Irrawaddy,† and close to the Himalaya, is the district of Dzain, where is the village of Samé two days distant from Oua.‡ the last Thibetan village in

\* There is a range of snowy mountains called Douk-la Gangri in Klaproth's map, but near the Gakbo, and considerably west of the supposed position of Bonga.—Y.

† For Irawadi read Tsanpo, which he assumes to be the same.—Y.

‡ There is a village called Wa-loung near Samé in Wilcox's map of the upper Brahmaputra.—Y.

the direction of the Mishmis. Between the two above mentioned districts are the pastures of Dromba where are the sources of the Kouts-Kiang.

“All that country, which forms a part of the prefecture of Sang-Nga-Kien-dzong,\* is purely Thibetan. All that lies south of it is peopled with savages formerly paying tribute to Thibet. The limits between the territories of each tribe are generally, according to the custom of the country, the summits of high ranges, impassable on account of the snow during the greatest part of the year. They ordinarily live on the banks of rivers which are to them the best and safest highways.

VIII. “For the names of those wild tribes, known under the general appellation of Lokatra, and the districts they inhabit, I am chiefly indebted to our boys, purchased at Bonga, most of whom belong to those tribes.

The Louts }  
Lisou } Chinese names.

Terong.

Renney pang.

Dedze.

Anampae.

Metious.

Dabou dam.

Pang dang.

Lam bem.

Damra.

Kabing.

Mooua.

Apo.

Mandeing.

Telou.

“It is difficult to determine the position of the localities occupied by thoses various tribes: what will be stated on his subject, requires more accurate information. It is the result of the reports made by individuals belonging to those various tribes. Persons

\* Sangak-tchoui-dzong is in Klapproth's map, near the sources of the Chodteng chiu, which may be the Kouts Kiang of the Vicar, and very possibly similar in pronunciation, for the relations between Thibetan spelling and pronuneiation appear to be complicated.—Y.



acquainted with the loose and always incoherent and disconnected statements made by savages on every subject of inquiry will readily understand how cautious one must be in giving belief to their sayings.

“*Louts or Anong*.—It is certain that below Bonga the valley of the Louts Kiang is occupied by the Louts\* (Chinese name) who in their language are called Anong, and in that of Thibet Guia, on an extent of four or five days’ journey. They are of a weak temper. They pay tribute both to the Thibetans and Chinese.

“*Lisou*.—The Lisou† occupy the same valley, as far as Yunán. They are said to be of very wicked dispositions.

“*Terong*.—South of the Dromba pastures the first population to be met with on the banks of the Kouts-Kiang, are the Derong, called, in Chinese Kuts, in Thibetan, Kiang or Kiong, and sometimes Tsong, and oftener Bain. Hence in Thibetan the Kouts Kiang is often called Bain Kioung, and by the natives Terong Ouang. In Chinese Kiang means river, which is translated Kiong by the Thibetans, meaning *water*, and Ouang in the native language has the same meaning.

“The Terong are separated from the Louts by one range of mountains. It is one of the most numerous tribes. Up to this the indications are tolerably correct, but the farther we move from Tsarong the less are they to be relied upon.

“*Renney-pang*.—Proceeding in a south-western direction, close to the Terong, are the Renney-pang. In that locality the Kouts-Kiang can scarcely be forded, but is crossed on rafts. That tribe is inconsiderable.

“*Dedze*.—In the vicinity of the two above-mentioned tribes are living the Dedze, called Dijon by the Thibetans. They inhabit high table-lands. They are celebrated for stealing cattle and carrying away the women and children of other tribes. In their country there is a small river called Ain Ouang.

† “*Anampae*.—They are probably on the banks of the Kouts-Kiang below the Renney-pang, though separated for a distance of two or three days’ journey by a territory wholly uninhabited. Throughout

\* The Louts are probably the Nouts or Louts of Klaproth’s map, giving name to the Nout-kiang, Lou-kiang, or Louts-kiang, as our author calls it.—Y.

† The Lisou are also in Klaproth’s map, to the north of Theng-ye-choo.—Y.

their country, there is great abundance of iron mines ; the steel is of a superior quality.\*

“ *Meliours, Daboudam.*—In the vicinity of the Anampae, live those two tribes ; they speak the same language. They manufacture earthen vessels.

“ *Pangdang.*—They are found close to the Dedze. The mountains in that locality have not much elevation, the country is somewhat flat and there is scarcely any snow.

“ *Lambenn.*—They sell Chinese pans ; it is probable they are on the banks of the Louts Kiang close to Yunán.

“ *Damra.*—Three days west of the Anampae, dwell the Damra. They are separated from them by a range of mountains.

“ *Kabing, Mooua.*—These two tribes dwell near the junction of the Kiang Ouan with another river, larger than the Kouts Kiang and all the others. This must infallibly be the Irrawaddy. The language of the Mooua is the same as that of the Pani who live near Yongpetin, in Yunán. They use European articles, weave cloth, and cultivate cotton. Some Thibetans maintain that the Mooua are the same as the Meneupguiebo, the Thibetan name of Burmah. There is no doubt but that tribe is close to Burmah.

“ The Kabing appear to be the same as the tribe of the Kakhien to be met with east and north of Bhamo.†

“ The Mooua are now probably some Shan tribe living in the same localities as the Kakhien. The latter dwell on the hills and the former in the valleys.‡

“ *Apo.*—They are separated by a range of mountains from the Damra on the west. They are said to be very wicked.

\* The Kakoos are mentioned below by Bishop Bigandet as celebrated for their *dhas* or swords. See also Mission to Ava, p. 146. Y.

† They are very numerous. I have seen hundreds of them at Bhamo whither they come to buy salt and some other articles. They appear of mild dispositions, though the Burmese represent them as cruel and treacherous. If some of them be really so, the ill-treatment they receive from the Burmese is the prolific cause of the evil.—*Note by Bishop Bigandet.*

‡ By their industry and mercantile habits the Shans are far superior to all the other tribes. They are exceedingly numerous, but unfortunately divided into a great many fractions. They are to be met with from the borders of Assam to the gulf of Siam. The Siamese are but one of the many Shan tribes, that is more advanced in civilization than the others, owing to the geographical position of their country on the extremity of the gulf of Siam. The Thibetans may possibly make no difference between the Shans and the Burmese.—*Note by Bishop Bigandet.*

“ *Mendeing*.—They are supposed to inhabit south west of the Mooua.

“ *Telon*.—Where are they? It is said that they live not far from the Dronba, since the Thibetans of Tsarong go and exact tributes from them.

“ This is what we have been able to collect respecting those tribes and the territories they inhabit.

“ Very grateful I would be to you, if you could send me the most accurate particulars respecting the north of Burmah, the course of rivers, the mountains, tribes, &c. &c. With the Chinese and Thibetan notions we may obtain here, something might be done for throwing some light on this part of eastern Asia, which is to Europeans a *terra incognita*. If there be some map of these parts, of a more recent date than that I have mentioned, have the goodness to procure it and forward it to me.

“ I may infer from the above that we are not far from each other, and that there may be a possibility of meeting each other on some future day. We would have to pass in the midst of tribes that are in general of a meek temper and good disposition, except when they are at war among themselves.

“ I will close this long letter with stating a curious fact. The Thibetans, of the province of Tsarong at least, are in great fear of the Burmah King. They say that it is written in their books that he will on a future period make himself master of their country.

“ Your affectionate brother in Christ,

(Signed) J. THOMINE MAZURE,

*Vic. Ap. of Thibet.*”

‘ As an addition to the above remarks contained in my friend’s letter I will, my dear Col. Phayre, convey to you the following scanty information I received from some Burmans when I was at Bhamo in 1857.

‘ It appears, that at his accession to the throne the present Ruler of Burmah sent an embassy to the Viceroy of Yunân. I conversed with several men that had, from Bhamo, accompanied the embassy. They stated to me that it took them 10 days to proceed from Bhamo to Momien, the first Chinese frontier town. On their way through Yunân they crossed on iron bridges three rivers, the Shoay-lee, the Salween and the Mekon. These bridges were described to me in the

following manner. I saw also a rough sketch of one of them made by a Burmese on the spot. Strong chains are laid horizontally on the stream from bank to bank and planks are placed and well fixed upon them. On each side at a height of about three feet, two other chains are likewise stretched across, and planks are laid vertically to secure the safety of passengers. These chains are carefully greased to prevent their destruction by rust. The bridges were ten cubits broad, men and beasts of burden cross them, and a small tax is levied by the Chinese authorities. I believe that the Kouts Kiang, the Louts Kiang and the Lantsan Kiang are respectively the Shoay-lee, the Salween and the Mekon or Cambodia river.

‘Here are the names of the wild tribes north and east of Bhamo; the Kakiens, Shans, Katou, Phoun, Anga Shan, Palaong, Kakou.

‘The Katou are divided in three tribes called Mokatou, Mein-pekou, Sanyua Katou.

‘The Kakiens are likewise subdivided into Marou, Tsinpho, Adzi, Lishi-sonce; if these names can be identified with those above described? The Kakou are celebrated for the *dás* or large knives they manufacture in great quantities, the blades of which are of the best description. When at Bhamo I saw one of those knives cutting large iron nails without receiving the least blunt.

‘Those rough and imperfect notes may possibly enable you to make an attempt to elucidate some controverted points respecting the places, countries, rivers, mountains and tribes of Burmah. No one is better fitted for such an arduous task than you, who have paid so much attention to all that has reference to Upper Burmah.

Believe me, my dear Col. Phayre,

Yours sincerely,

(Signed) + PAUL BIGANDET.’

---

*Remarks on M. DEMAZURE’S letter.*

The reverend writer justly calls the land from which he writes a *terra incognita*. The circle of unknown territory in the interior of Africa is rapidly shrinking, whilst of eastern Thibet we have scarcely added to our knowledge in the present century. This will not, we

may hope, continue so much longer.\* Meanwhile it is startling to receive a contribution to the Society's proceedings from this unknown corner of the world ; but these brave Roman Catholic priests penetrate everywhere.

Grateful as we ought to be for this contribution, we must not accept all its geographical indications for facts. To appraise them properly it would be necessary to determine what the worthy Vicar Apostolic has derived from actual observation and information received in the country, and what are merely preconceptions derived from the maps in his possession.

The map which he names, that of Andriveau Goujon, Paris, 1841, we have not been able to find in Calcutta. But there can be little doubt, from the missionary's references, that it is substantially the same in its peculiarities with the map constructed by Klaproth for his *Treatise on the Irawadi*. Nearly the same is Berghaus's map of *Further India* 1843, which I also produce. These maps show the country of the Khana Deba, Tsatsorken, and other places named by the Vicar Apostolic.

Now this map of Klaproth's, which I take to be the basis of the missionary's general ideas of the geography of the country in which he lives, was compiled from Chinese sources for a specific purpose, viz. that of demonstrating that the great Tsanpo river of Thibet was identical with the Irawadi, and not with the Brahmaputra as we believe.

I do not know whether anybody on the continent still maintains this view. Thirty years ago it was the subject of earnest controversy, and seems to have become almost a national dispute, Englishmen for

\* We see that intelligence has been received of the English travellers now advancing towards Lassa, from Chung-king upon the great Yangtse Kiang on the 28th April, and that they were about to proceed towards Ching-tu the capital of the province of Sechuen. This town is on one of the branches of the great river in Lat.  $30^{\circ} 50'$  and Long.  $104^{\circ}$ . Hence we see that they will pass far to the north of the country of which the Vicar apostolic speaks in this letter, their route probably lying by the great military road through Bathang and Tsamdo (the latter at least as high as  $31^{\circ} 30'$ ) of which the route is given in great detail in Klaproth's description of Thibet. If, as we trust, they accomplish their great journey, they will be the first European travellers who ever have done so. About 1660 the journey through Lassa from Pekin to India was accomplished by the Jesuit Fathers Grueber and Dorrville. But they followed to Lassa the same route that was taken by the missionaries Huc and Gabet in their wellknown journey, passing from the neighbourhood of the Wall of China to the great lake the Koko-noor, far to the northward. [I need scarcely add that since this was written Col. Sarel has been obliged to abandon his journey.]



the Brahmaputra, Frenchmen for the Irawadi. Twenty years ago we see that it was an assumed fact in the map of the German geographer Berghaus; though I observe that in later maps he has quitted the position. So possibly it may be warring with ghosts to say any more on the argument. It is certainly an interesting question, if it be a question, whether the river, on whose delta-branches stand our thriving ports of Rangoon and Bassein, does or does not come all the way from the mountains north of Rohilkund; whether its sources are in the mountains of Khamtee, or are fifteen degrees further west. It is a question which reminds us of that of the course of the Niger, which the *Quarterly Review*, if I recollect rightly, tried hard to argue into the Nile, till the Landors solved the problem by descending to the Gulf of Guinea. We are not likely yet a while to find a Landor for the Tsanpo. It is not navigable, and the savages that border Thibet are much more unmanageable than the negroes of the Niger. You will find the matter ably discussed by Wilcox in the 17th volume of this Society's quarto researches, and a resumé of all the available subsequent information on the subject in an appendix to my account of the Mission to Ava in 1855.

The idea that the Irawadi was the debouchement of the Tsanpo was first started by D'Anville. It was maintained by Dalrymple, the author of the *Oriental Repertory*. And it was revived by Klaproth, who supported his view by citations from Chinese geographers and state papers, by arguments from physical geography, and by maps based on Chinese sources. He insisted that the great river of Thibet passed through Yunán and entered the Burmese territories at Bhamo, there joining a river flowing from the north to form the Irawadi which passes by Ava.

Since Klaproth wrote, Bhamo has been several times visited by European travellers, (by Col. Hannay, Dr. Bayfield, Dr. Griffith, Kincaid the American missionary, and as we see here by Bishop Bigaudet), and it is well ascertained that the river which enters at Bhamo from the Chinese frontier is an inconsiderable one. The upper Irawadi was also visited in 1827 by Wilcox, not far from its sources in the snowy mountains of Khamti. It was indeed ascertained both by him and by Col. Hannay that there was an *eastern* branch joining with the western, according to the latter about Lat. 26°. And, as this has been seen by no European eye, it *might* of course prove to be

the continuation of a great Thibetan river, though such evidence as could be got was against the supposition. We shall see if M. De-Mazure throws any light on this presently.

The Tsanpo in Thibet has been reached by only one traveller in modern times, at least only one who has narrated his journey, viz. Turner, on his Embassy in the days of Warren Hastings. Turner was told by the Thibetans that the river entered Assam. So says Father Giorgi who wrote on the authority of the Catholic missionaries in Thibet in the last century.\* The measured discharge of the Dihong in the month of January is 56000 feet per second, probably more than twice the low water discharge of the Ganges at Benares, and considerably more than the low water discharge of the Indus at Attok, (a river which so singularly resembles it in its course, on the assumption that the Tsanpo and Dihong are the same)†. This alone is almost enough to decide the question. For if the Dihong is *not* itself the Tsanpo, the Tsanpo must limit the basin that feeds the Dihong in a manner quite irreconcilable with the enormous discharge of the latter.

With a philologist who has a theory to maintain, it is said that vowels go for nothing and consonants for very little. With a geographer who has a theory to maintain, we may say that latitude goes for very little and longitudes for nothing.

Klaproth, not aware indeed of the discharge attributed to the Dihong, at least when his theory was started, tried to provide for the difficulty we have just alluded to by carrying the southern turn of the Thibetan Tsanpo a degree and a half to the eastward of its position in D'Anville's maps and by carrying the Dihong's mouth forty miles to the westward of its *known* position, besides twisting its direction in a way for which there is no foundation in fact.

\* "Sesque tandem in Gangem exonerat." *Alphabetum Tibetanum*, p. 343, Major Dalton, long resident in upper Assam, stated at the Society that the general belief of the people near the Dihong was, that it came from Thibet. The Dihong and the (eastern) Brahmaputra are the only rivers of Assam which they admit to come from Thibet. Major Dalton believes both the Dibong and the Subanshiri, great as their volume is, to be derived entirely from the Himalya and not from Thibetan sources.

† Wilcox mentions the traditions of a great and destructive flood on the Dihong in the last century, analogous to the Indus "cataclysms" of 1841 and 1858. Major Dalton at the Society's meeting mentioned a more curious Assamese tradition, viz. that some centuries ago there was *no* Dihong, but that it appeared by sudden irruption into the valley.

Now, this is the kind of preconception with which our worthy Vicar Apostolic starts, and we must try to eliminate this preconception from all his statements which it affects.

It will be seen that he is describing a succession of parallel rivers, separated by parallel chains of mountains just as they have fixed themselves in his mind from his French map. His own position at Bonga he states to be in a valley of the mountains between the Lantsang Kiang (which is well known as the Chinese name of the Me-kong or great river of Cambodia), and the Louts Kiang, which is without doubt the Loo-kiang or Noo-kiang of our maps, the Salween of Tenasserim. Bonga, he says, is near the great bending of these two rivers and in about  $28^{\circ} 15''$  latitude as well as he can judge.

Westward of the Louts Kiang, at a distance of 30 miles, is a range of high mountains, and west of those "a rather inconsiderable river" called the Kouts Kiang or Schete-kiang, which he describes as known in Yunân under the name of Loungchang-kiang, as flowing east of Tenine (or Theng-ye-choo,) and joining the Irawadi below Bhamo.

This is so precise, that it is difficult not to accept it as derived from actual information. There can be no doubt that the description of this Kouts Kiang in the lower part of its course applies exactly to the Shweli, a tributary of the Irawadi, which it enters in Lat.  $24^{\circ}$  nearly. It is variously described by the British officers who passed up the Irawadi in 1837 at from 300 yards to 600 yards wide at its mouth, full of shoals and discharging little water. The width however indicates that at times it carries a large body of water. It is mentioned by the Chinese geographers quoted by Klaproth under the name of Loung-chuan-kiang, probably from its passing near Loung-chuen the Mo-wún of the Burmese. It is on a small tributary of the Shweli that the celebrated ruby mines of Ava are found, and near its banks in former days stood two important cities; that of Mweyen or Mauroya, the most ancient capital of the Burmese kings of sacred Indian descent, and supposed to be mentioned by Ptolemy as *Maureura metropolis*; and Maulong the capital, in later times, of a Shan kingdom.

Just a doubt remains whether this identity of the Kouts Kiang and the river Shweli is not suggested by his map rather than got from

local knowledge. Such a lengthened course of the Shweli is indeed given conjecturally in the map of Klaproth who brings it down from a combination of several of the rivers of Thibet. Just above the town of Theng-ye-choo, he gives it the Chinese name of Khiu-chy which perhaps corresponds to the Kouts of our missionary.

But supposing that this is not the case, that this is really the Shweli which flows down from the latitude of Bonga, the course of the river is a very singular one; it so far justifies the theories of Klaproth's map, and it forces us to carry the eastern source of the Irawadi much nearer to the western one than we have placed it hitherto, on the information given to Hannay that they were eight days' journey asunder.

Proceeding westward, the Bishop says that "Between the Kouts Kiang and another considerable river that flows into the Irawadi there are several ranges of mountains, the general direction whereof is from south to north. That river is named *on the maps* Gakbo-dsanbo. Its course through Thibet appears to be very different from what has hitherto been supposed. Its junction with the Irawadi must be placed somewhere more in the south.\* That called by the Chinese Kanpoo Tsangbo"—this I have no doubt is mistranslated, and should be "*this*," viz. the Gakbo-tsangbo of the maps—"called by the Chinese Kanpoo Tsangbo is named by the people of Bonga Dzain, because it flows through the sub-prefecture of that name. In that district, according, to the Thibetans is the village of Samé where our two priests Messrs. Krick and Boury were murdered."

He then goes on to allude to the Yaro-tsanpo of our maps and to express his conviction that *there is not the least doubt* that this great river is the Irawadi. It is curious that this is just the same expression as is used by the Chinese geographers quoted by Klaproth. "There is no manner of doubt," say the Editors of the grand Imperial Geography,† that this great navigable river that flows through the kingdom of Mian or Ava is the Yaroo-dzangbo of Thibet. But this sort of assertion rather implies an absence of argument, and does not carry conviction to a reader. The Vicar goes on to give reasons however, and a very good specimen of circular logic his reasoning is.

\* Qr. North?

† Klaproth, *Memoire sur les sources du Brahmaputra*, etc. p. 281.



“I believe that its bending must be brought more to the east. This would agree better with the observations made by the English on the tributaries of the Brahmaputra. The latter cannot possibly be the Yarkiou-tsangbo.”

Now observe his reasoning.

‘1st. There is no doubt that the Yaro-dzangbo is the Irawadi.

‘2nd. Its bending must be brought more to the east’ (i. e. to enable it to be the Irawadi.)

‘3rd. The Brahmaputra cannot possibly be the Tsangpo’ (i. e. because the Yaro-Tsanpo’s bending goes so far to the east, where we have just obliged it to go).

But just let us get rid of this notion and all his information will fall into place, and leave little difficulty remaining.

The Lantsang-kiang, and the Luts Kiang or Loo-kiang we are already familiar with on the maps. The Kuts Kiang we will admit to be the Shweli running into the Irawadi. We have then, he says not one, but *several* mountain ranges running from south to north, and we come to the river which the Thibetans call Gakbo, and the Chinese call Kanpoo. The Gakbo you will find, as I have said, in Klaproth’s map forming an imaginary junction with the Kuts-kiang or Shweli. In a map of Berghaus’s published in Perthes’s Gotha Hand Atlas (1860) you will find it doing duty as a tributary of the Yaro-tsangpo. In the original authority for the Thibetan geography, or at least in the nearest form to the original which is accessible to us and not biassed to meet theories, that is to say in D’Anville’s Atlas, the river is found, under its Chinese name of Kenpoo, in a position which identifies it either with the Dibong or with the (eastern) Brahmaputra.

· The mention of it by the Vicar Apostolic as the river on the banks of which the priests Krick and Boury were murdered identifies it with the latter, and this murder of two missionaries becomes thus in fact the basis of a geographical connection between British India and Thibet. For these gentlemen were murdered about the month of August, 1854 (as we know from the reports of the British officers in Upper Assam) at a village called Simé\* (the Samé of the Vicar Apostolic) near the banks of the eastern or real Brahmaputra, where

\* This village is entered from native information in Wilcox’s map, dated many years before the murder of the abbés.



they had halted for some time to acquire the Thibetan language before penetrating into Thibet by that route from Assam.\* This fact therefore should satisfy M. De Mazure that his theories about the Irawadi are all wrong. Not only so, but if he is right about the Kuts Kiang being the same as the Shweli, you will observe that between this Kuts Kiang and the Kenpoo, which we have identified with the Brahmaputra, he mentions *no river*, so that his evidence, so far as it goes, is against the derivation of any supply to the Irawadi from the mountains of Thibet, excepting what enters by this river Shweli. If again his identification of the Kuts Kiang with the Shweli is only a deduction from his maps, I would say that it is highly probable that this Kuts Kiang is *not* the Shweli, but is the unseen eastern branch of the Irawadi called in our maps the Shu-mai-kha.

Indeed every attempt to construct a map which shall combine with the data ascertained by Wilcox in his journeys, those furnished by M. de Mazure, including the most liberal estimate of the "seven days hard travelling" which he places between Samé and Bonga, ends in something like a conviction that his river Kuts-kiang is really the eastern branch of the Irawadi, the Shumai Kha of our maps. To make room for the Shweli in this position the Loo-kiang and its parallel rivers must be moved considerably further to the eastward than any maps represent them. But then Bonga will be carried very much beyond any possible seven days journey from Samé in such a region. We do not seem to be in a position to solve the difficulty, but could communication with M. de Mazure succeed in removing his erroneous views about the Irawadi, then he might supply most valuable information.

The Vicar says, "The spurs of the range that are north and south of their habitation are called Dokerla and Dokelá. The latter is visited by innumerable pilgrims from all parts of Thibet who come to worship the Spirit *Kaoua Kerbo*, that is to say the *White Snow*." We find this mountain under the name of *Kawa Garbou Gangri* in Klaproth's map, but in Lat. 28° 45' and to the north of the position which is assigned by the missionary to his establishment.

East of the country traversed in passing from Bonga to the Ken-

\* See "Official and interesting correspondence &c. regarding the melancholy and brutal massacre of the Rev. Messrs. Krick and Boury, Priests of the Society of Foreign Missions, Calcutta—R. C. Orphan Press, 1855."

poo he describes the district of Tsarong, or Tsatsorken, terminating on the Dokerla north of their establishment. And between the district of Tsarong and the Dzaing are the pastures of Dromba.\* "All that country" the paper says, but evidently in English we should say "all *this* country" viz. of Dromba, in which are the sources of the Kuts-kiang, is purely Thibetan," and all south of it is peopled with savages. These are probably the Mishmis and other tribes adjoining the upper Brahmaputra.

I can add nothing of any use regarding the wild tribes catalogued in the latter part of the letter. The indications are nearly all too vague, and Bishop Bigandet has anticipated the few remarks that could be made.

It should be noticed that when this paper was read, I was under the impression, derived from high authority in matters geographical, that the Abbés Krick and Boury had been murdered, not on the upper Brahmaputra, but near the banks of the Dihong. Accidentally Major Dalton, the officer who made the official investigation into the crime, and by whom the murderer was convicted, was present at the meeting and corrected this impression. It need scarcely be said that the assumed position on the Dihong would have been much more difficult to reconcile with the Vicar Apostolic's statements. Several passages in the present comment have been altered in accordance with this correction.

---

*Letter to the Secretary of the Asiatic Society of Bengal, on some Recent Statements touching certain of the Gupta Kings and others.*  
—By FITZ-EDWARD HALL, Esquire, D. C. L.

SIR,—With many other well-wishers of India, I hail it as an encouraging sign, that the natives of this country are beginning, here and there, to evince an intelligent interest in the history of their

\* This should perhaps be Dromla. There is a range of mountains called Douroungla in this position in Klaproth's map. *La* I believe in Thibetan signifies a mountain pass.

forefathers. It has been, therefore, with no little gratification, that I have read Bábú Rájendralál Mitra's paper on the Toramānas, in the last number of our journal which has reached me.\* Consulting the Bábú's welfare, I would, however, exhort him to the study of accuracy, and to an advised consideration in the choice of his premises. Several remarks of mine he has lately honoured with his notice; and there are those who, prompted by curiosity to read what he has written, would scarcely accord more than a glance, if even that, to my "Note on Budhagupta."† The design of the present short letter is, to point out a few instances in which the Bábú has mis-stated my conclusions, and in which he has taken for postulates positions which are still unestablished.

Speaking of Mr. James Prinsep's "translation of the Eran records," the Bábú, after calling it "sadly defective in many respects," goes on to say: "Even the proper names, in two instances, are misrepresented; and the paramount sovereign Tárápāyi appears only to be a mislection of Toramāna. Col. Cunningham was the first to point out the mistake with regard to the name of the King; but, by assuming the rest of Prinsep's translation to be correct, he was led to opinions which the advantages of subsequent researches shew to be other than well-founded. He supposed, that the record adverted to a regency of Dhanyavishṇu, during the minority of the young prince Toramāna, and, by a curious mislection of the document now under notice, made him the son of Máṭṛidāsa, and the grandson of Máṭṛikula. According to him, the principality of Toramāna extended from Eran to the banks of the Jumna, and his reign from A. C. 520 to 550. Mr. Fitz-Edward Hall, in his 'Note on Budhagupta,' accepts these deductions, with only a few reservations. He assumes Toramāna to have been 'an usurper, and a proximate, if not the immediate, successor of Budhagupta, the first sovereign of a tentative independent branch [of the Gupta dynasty?] which almost certainly ended with himself.' "

Manifestly enough, the drift of this passage is, in the main, to sum up the errors of Mr. Prinsep and Colonel Cunningham. The summary finished, I am taxed with accepting "these deductions, with only a few reservations." What deductions are intended? And how many of them have I accepted? Can the Bábú indicate

\* *Vide supra*, pp. 267-278.

† *Vide supra*, pp. 139-150.

a single assertion, or inference, made by the gentleman aforesaid, now known to be wrong, that I have signified my adhesion to? In passing, the "subsequent researches" which the Bábú alludes to are, I believe, entirely my own. But who would ever have surmised so from his language? Nor have I written about Toramána what is imputed to me above; nor have I, as the Bábú, a little further on, says I have, ventured on the "assumption," that Budhagupta was first sovereign, &c. I cite my own words: "Budhagupta, by possibility, may have been the first sovereign of a tentative independent branch, which almost certainly ended with himself; for Toramána, his proximate, if not immediate, successor, was not a Gupta, and very likely was a usurper." The expressions "by possibility" and "very likely" do not, to my apprehension, denote assumption.

Again, the Bábú, having pronounced Toramána to have been "an usurper in central India, and a rebel in his own country," adds: "Mr. Hall admits the first," &c. On this I have simply to remark, that the phrase "very likely" does not express admission any more than it does assumption.

My circumspection of phrase with regard to Budhagupta and Toramána thus appears to have had but indifferent success. The very first person who uses my observations about those kings ascribes to me opinions, respecting them, which I never entertained, and which I wholly repudiate.

As an argument to uphold my view, that Toramána was a sovereign, I wrote: "By the kings of all ages, the minting of money has been jealously reserved as a royalty; and Toramána is known to have coined copper." On this the Bábú observes: "We shall presently shew, that a Toramána did strike gold without assuming the imperial purple, and that his copper coins are still extant; not to advert to the privilege of coining held by the Cæsars or younger Rájás of Rome." And this Toramána, as my critic himself informs us, met with "an untimely death in a prison, to which he was consigned for his presumption in striking coins in his own name during the lifetime of his liege lord." That this makes directly in my behalf, it can require no great perspicacity to discover. As for Cæsars, or *Yuvarájas*, it is well known, that, to all interests and purposes, they were full kings. Certainly in India, they issued royal charters; and, not improbably, they issued money. I have never denied that they did so.



The solecistic "imperial purple" of Hindu rulers shall not detain me for a comment.\*

\* At p. 149, *supra*, I have written as follows: "My paper on the land-grants of Hastin, and that on the Eran inscriptions, as I did not see the proof-sheets, abound in errors of the press, to say nothing of other faults. The more important will here be rectified, and a few comments interspersed." As soon as I saw in print the second paper just mentioned, I amended, for my private eye, part of a sentence in the translations which it contains, in these words: "Mátrivishnu, a most devout worshipper of Bhagavat; providentially preferred by Royal Prosperity, as it had been a maiden who elects her husband; of fame diffused as far as the four oceans; whose wealth of high-mindedness was never diminished; victorious, in battle, over many an enemy," &c. I could go on; but the Bábú will, from my own indications, already be fully satisfied,—if he gives himself to a close inspection of the above,—that he has entered the lists against fallibility. In that for which I have thus given a substitute, the Bábú has tracked out a dissyllable that I at first overlooked, and has detected one other error of similar magnitude. So nice an Aristarch, especially when he enjoyed the advantage, which a neglect on the part of the printers gave him over me, ought to have reaped a richer harvest. *Verbum sat*. He has seen, that, in two trifles, I was in the wrong; but it would be easy to show, that, in trying to set me right, he has himself opened a door for criticism.

One point more,—one not quite so minute. Mr. Prinsep, in his analysis of the Eran inscriptions, speaks of "Tárapáni"—rightly, Toramāna,—as "of Surāstra (?)," and afterwards speaks of "Budhagupta in Surāstra." All this I quoted in my "Note on Budhagupta." The Bábú says of Toramāna: "Prinsep threw out only a conjecture, when he called him a king of Saurāstra" (*sic*); and he subjoins, in a note, "not, as has been supposed, by the misapprehension of a word in the inscription, which Mr. Hall (ante, p. 18.) has read *sansurabhu*." The Bábú must pardon me for declaring, that I never supposed any such thing. The word which I read *sansurabhu* occurs in an inscription where there is no mention of Toramāna, but in one where there is mention of Budhagupta. As I have shown, Mr. Prinsep was uncertain as to the empire of the former, not as to that of the latter. His *sansuratam* he translates, erroneously, by "beautiful country." There is scarcely room for question, that in a moment of forgetfulness, he thought it was in the Budhagupta inscription, and that he considered it to be equivalent to *surāshtra*, beautiful kingdom, literally, and the name of a realm. A home—covered up in *sansuratam*—thus found for Budhagupta, it was natural, I allow, to conjecture, that Toramāna also, who came shortly after him, and was commemorated colloqually with him, might have been of Surāstra. On any other theory than this, Mr. Prinsep's "Surāstra" is inexplicable.

But the Bábú's oversights about my *Sansurabhu* do not stop here. It was insufficient, it appears, for me to have written, that "what I read *Sansurabhu* is doubtful in its penultimate syllable, and very doubtful in its final." Touching this reading of mine, the Bábú says: "It would be a presumption, on our part, to question the reading of one who has the evidence of his own eyes to support it; and yet we feel disposed to think, that Mr. Hall's reading is the offspring of an illusion." For the courtesy of this, I thank the Bábú; but his inconsistency distresses me. Furthermore, it goes, with the Bábú, for but little, I find, as contributing to induce credit in the trustworthiness of my version of the Eran inscriptions, that "standing before the originals, I compared my facsimiles, letter by letter, with those that have been lithographed; and every the slightest dissimilarity of the copies was patiently tested by the perishing archetypes." The lithographed copies were those of Mr. Prinsep.

The venerable Pāṇini is summoned to complete my annihilation. *Sansurabhu*, the Bábú avers, is a word that flies in the face of the aphorism *ते प्राग् धातौ*, which imports, according to my critic, that inseparable prepositions "should be used before verbal roots only." Common sense should of itself suffice to explain

On the Bábú's proposal to identify Toramána of Kashmir with the Toramána of the Eran inscription, I have to offer only one or two suggestions. Are we sure, that the former lived "about the end of the fifth century?" Far from it. And are we sure, that, as the Bábú takes for granted, the latter belonged to that age? Not at all. No attempt whatever has been made to set aside my implied assignment of him, on the basis of an ascertained date, to the first half of the second century,\* and the time of Budhagupta, on which his own depends, is hypothetically reckoned by the Bábú, in an era which perhaps began A. D. 278. The result is a difference of three hundred and thirty-five years.

Hiouen-Thsang's Buddhagupta must have flourished at least a

the aphorism; but I annex the amplification of it given in the *Siddhánta-Kaumudí*:

रे गत्युपसर्गसञ्चका धातोः प्रगेव प्रयोक्तव्याः. The incidence of the *eva*, "exclusively," is unmistakeable. Páṇini means, that it is only before verbs, and never after them, that such particles as *sam*, &c. can be used in composition. These prefixes are by no means restricted to direct connexion with verbs, or with any other class of vocables; and to all such they are non-essential. As the Bábú interprets Páṇini, authority is wanting even for putting one inseparable preposition before another; and yet in compounds by the myriad, we come upon these prepositions lying from two to four deep. In the very inscription where I could make out of chaos nothing better than *Sansurabhu*, we have *anuridháyin*, *ápyáyana*, and *abhychchhrita*. The Bábú, to be consistent, must ostracize them. And what of *Sankaṭa*, *Samadhika*, &c. &c.?

Mr. Prinsep's decipherment *Sansuratham* has the Bábú's approval; and he analyzes it into *sam*, "with," or "altogether," *su*, "well," and *rata*, "pleased." He has laid down, that "the particle *sam* is seldom, if ever, used before other than a verb or a participial noun;" and he thinks it "not at all likely," "that the writer of the inscription should have so sinned against grammar" as to write *Sansurabhu*. In so saying, he fails to perceive, that his condemnation of another applies just as much to himself; for *su*, "well," precisely like my *sura*, "god," is neither a verb nor a participial noun.

Finally, as for the epithet *Sansurabhu*, I have only said, and with all distinctness, that one must render it, "if right," by "in which is the good land of the gods." I have far from intimated any confidence in the correctness of my reading; and I have no partiality for it whatever. The fact is, simply, that the original symbols looked to me, in the dilapidated condition in which I found them, rather like the constituents of *Sansurabhu* than like anything else. That *Sansuratham* is not on the Eran column, I am quite positive, the Bábú's suspicion of "illusion" to the contrary notwithstanding. Both words are artificial and unnatural; but *Sansuratham* is the more so. In the account of grammatical propriety, they are pretty much on a par.

It will have been perceived, that I have not here had to retract anything. *Sansurabhu* must have passed uncensured, had the Bábú chosen to give proper heed to my account of it which he had before his eyes. This I have now made plain. If, in doing so, I have reciprocated somewhat of the animadversive attention which has been bestowed upon me, the reciprocation has not been altogether voluntary.

\* *Vide supra*, p. 15, second foot-note.

hundred years before our era. But the Bábú, like Professor Lassen, after silently converting him into Budhagupta and from a Buddhist into a Hindu, takes him to have been one with the Budhagupta of Eran. This identification is utterly untenable; and the Bábú had before his eyes the clearest evidence of its being so.\*

The Bábú likewise writes, as if he were dealing with demonstrated historical verities, of "Kumáragupta, several generations before Budhagupta assumed the royal sceptre," and of "Skandagupta, the immediate predecessor of Budhagupta." Not to my knowledge, is there one particle of proof, that Kumáragupta preceded Budhagupta, or that Skandagupta did, whether immediately, or after an interval. That with Skandagupta, "to all appearance, the glory of the Guptas set for ever,"† is a conclusion of mine which, till we possess ourselves of fresh data, is likely to hold its ground.

In parting, I would remind the Bábú, that fidelity of citation and reference is a negative virtue not to be contemned by any of us; and that, if one is minded to build, it is well to select weather-proof materials.

I have the honor to be,

Sir,

Your most obedient Servant,

FITZ-EDWARD HALL.

*Camp Jubbulpore, January 1st, 1862.*

\* *Vide supra*, pp. 143-147.

† *Vide supra*, p. 148.

---

*Literary and Miscellaneous Intelligence.*

Mirza Abdul Wujood who brought Mr. Adolphe Schlagintweit's note-book and skull to Lord Wm. Hay, gave precisely the same account of the circumstances of the traveller's death as that given by Muhammad Amin and Kashmiri Abdoolah. The head after execution was hung on a bridge in the vicinity of Kashgar. Shortly after it was suspended on a tree, from which it was taken down and buried in the ground by a grower of melons who pointed out the spot to the Mirza. The note-book contained 135 pp. of MS. and has been sent to Europe. There seems reason to doubt the genuineness of the skull.

Capt. H. G. Raverty is bringing out Selections from the Poetry of the Afghans from the 16th to the 19th century, being literal translations from the Pushtoo texts lately published by him in the Gulshan-i-Roh. The author will add notices of the different poets and some remarks on Sufi literature.

An April letter from Professor Wright, lately appointed Assistant Librarian in the British Museum, with special charge of the Syriac MSS. has the following.

"That part of *Ahmad al-Yākūbī's* geography that relates to *al-Maghrib* has been edited and translated by *de Goeje* of Leyden in very good style. He is also busy on *Ibn Haukal*; and *Wustenfeld* upon *al-Bakrī's* معجم ما استعجم. *Barbier de Maynard* of Paris is going, I believe, to publish all the articles from the great معجم البلدان of *Yākūt*, that relate to *Persia*. I only wish that a few scholars would combine to publish this huge dictionary, and we could then dispense with nearly every other work of the sort.

The British Museum has just purchased the late Col. *Taylor's* (successor to Rich at Bagdad) collection of MSS., Arabic, Persian and Turkish, for £2000. It is well worth the sum. The poetry is poor; but the history, geography, law and philosophy are very fine."

---

The following inscription from a ruined Mosque (so described by the Executive officer) on the old Badshahee road which is still traceable through the Beerbhoom District, is worth preserving.



هو الله

قَالَ اللَّهُ تَعَالَى • مَنْ جَاءَ بِالْحَسَنَةِ فَلَهُ عَشْرُ امْتِلَاحٍ \* بَنَى  
هَذِهِ السَّقَايَةَ السُّلْطَانُ الْعَالِمُ الْعَادِلُ الْمُعَظَّمُ الْمَكْرُمُ عَلَاوَالدُّنْيَا وَالْدِّينِ  
أَبُو الْمَظْفَرِ حُسَيْنُ شَاهِ السُّلْطَانِ ابْنُ سَيِّدِ أَشْرَفِ الْحُسَيْنِيِّ خَلَدَ اللَّهُ  
مُلْكَهُ وَسُلْطَانَهُ فِي سِنَةِ اِثْنَى وَعِشْرِينَ وَتِسْعِمِائَةٍ

*Translation.*

*He is God.*

The Most High God hath said,—“Whoso doeth a good action—his reward shall be tenfold.”

This drinking-place (a fountain or well) was built by the Wise, the Just, the Illustrious, the Noble, the Pride of the World and [Glory] of the Faith, Soltan Aboo 'l Mozaffar Hosain Shah, son of Saiyid Ashraf al-Hosaini, may God perpetuate his empire and government; in the year of the flight 922.

The remains of what is believed to be a Buddhist Vihar have been discovered on the railway works half way between Bhaugulpore and Monghyr. They were some ten feet below the surface, and among them is a brass figure eight feet high with other smaller pillars of stone and clay bearing partially obliterated inscriptions.

Dr. Jerdon of the Madras Army who had come up from Burmah in the hope of joining Capt. Smyth's expedition to Chinese Tartary has been placed by Lord Canning on special duty to enable him to carry out the publication of his Natural History of the Vertebrate Animals of India. His work will include the animals of the Indian Continent from the Burrampooter to the Indus, but will exclude those of Thibet and Assam, and the countries to the Eastward.

The Birds are to be the first portion published and will consist of two volumes, the first of which (containing the Raptores and the greater part of the Insessores,) is now in the press, and will it is hoped be ready in the course of the cold weather. It will contain

descriptions of all the species known to inhabit India, but will not give all the synonyms in detail as is done in Horsfield's Catalogue, as too much space would be occupied. Reference however is in all cases made to Horsfield, Blyth, and other writers on Indian Ornithology, the habits when known, and geographical distribution are fully noticed.

Mr. Blyth, who left Calcutta for Moulmein in October on account of his health, writes as follows from Pahoon, on the Yunzalin River, tributary to the Salween, November 20th, 1861, (lat.  $18^{\circ} 7' 43''$ , long.  $97^{\circ} 26' 0''$ .)

"I reached this station on the 15th, after fifty-two miles' trudge through the jungles, in four marches; not much fatigued, but a little foot-sore,—through jungle all the way, and therefore mostly in shade. Four days poling up the Salween, then a day's halt, then one day up the Yunzalin, and finally the land journey. But there is not much to be done here in the Natural History way, at least at this season; the underwood being so dense as to be impassable, except where paths have been cut, and these generally are in great need of their annual repair. Besides this, there has been rain as yet daily, which has brought out the land-leeches in abundance. In fact, we are here hemmed in by dense jungle, far too dense for any successful shooting; with just a few paths in different directions, one or more of which are now being re-cleared. One leads to a patch of teak-forest, after passing a quantity of elephant-grass, the path through which has at length been opened out, much to my convenience. There are fine hills close by; and in them Gibbons abound (*H. lar*), and I often hear them. The only mammal yet obtained is *Sciurus Phayrei*—common; but I have seen what I take to be *Se. Berdmorei*,\* also numerous mole-hill like casts of *Rhizomys*, and footsteps of Tigers and Deer,—Muntjæ too I have seen, a small house-rat, and bats,—also the earth turned up by Pigs,—but nought else of mammalia. There is a troop of wild Dogs about, which the Karens say have driven off the Tigers from this immediate vicinity. Of birds, the commonest are *Pal. javanicus* and *P. cyanocephalus*, then *Garr. Belangeri*, and I have obtained the *G. chinensis* of my Catal. (not uncommon): I doubt if it inhabits China. Jungle Fowl and *Gallophasis lineatus* are common. By the way, the generic name *Nycthemerus*, Swainson, should stand for

\* Since obtained.

this division. Very few other birds—*Megalaima lineata*, Sháma, *Turtur tigrinus* (as distinguished from *T. suratensis*), *Treron Phayrei*, *Melias tristis*, *Mot. luzoniensis*, *Pycn. nigropileus*, *Caprimulgus monticolus*,\* and on the river sand-banks *Esacus* and *Hopl. ventralis* abound. *Nycticorax* common, and the usual small *Totani*. I have not even heard a Woodpecker, at least here, but on the march I noticed *Chr. sultaneus*, *G. viridanus*, and *Meigl. jugularis*.† Of Hornbills, only *B. albirostris*, which my host insists is *capital eating*. These Karens are an impracticable set: they are now busy with their rice-harvest, but I hope soon to get fish, &c. from them. Not any as yet; nor orchids, though plenty about. Of plants, the *Plumbago rosea* grows wild here, of the large full-coloured variety, looking very splendid. Also the fine *Eranthemum erectum*. *Thunbergia laurifolia* (vel *Burmesiana*) abounds in the jungle, and I have once met with *Th. odorata* in deep jungle. Ferns are numerous. Of insects remarkably few. On the Yunzalin river I twice saw the fine *Papilio polymnestor*, which I had hitherto only seen from Lower Bengal; but very many of the common Bengal butterflies are about here, still not numerous. At this season it is decidedly an unfavorable place for making collections, as there is scarcely any getting about, and the tree-jungle is very high, and most difficult to distinguish birds in, straining one's neck till it aches in the perpetual effort. The Karens are civil and quiet, but quite indifferent to any money payment. They won't sell their ducks and fowls and pigs, and won't settle down to regular cultivation. And what is strange, for thorough jungle-wallahs, they have no notion of entrapping any thing, and do not fish at this season. A Burman has just brought me in a small *Monitor dracæna* and a small common *Calotes versicolor*, and these are almost the only reptiles I have seen,—not one snake as yet, save a *Tropidonotus* (?) in the Salween. My people tell me, however, that they have seen one or two snakes—likely enough. I have walked miles without seeing a single thing to shoot at, and often without hearing a chirp. On the march we came on the remains of a Peahen (*P. muticus*), killed by some jungle-cat. I also twice came upon huge specimens of *Scorpio afer*, right in the middle of the foot-path, and scorning to move off. From all this you will perceive that I have not

\* Also the fine *Lyncornis cerviniceps* of Gould,—very plentiful.

† Many species since obtained.

been very successful yet, and am here at the wrong time of the year for collecting. When the underwood is (annually) burned, it might be different."

---

Annexed is an extract from a letter dated 17th December, from Capt. E. Smyth to the President. There is clearly no difficulty to be apprehended from Chinese officials in traversing this part of Thibet. The "watching" of the traveller here alluded to, is not observed with a view to impediment, and would probably be abandoned even as a precaution, could the traveller show the "red chop." It is to be hoped notwithstanding the late unfavourable reply to our Viceroy's application to Peking, that the required passports will yet be obtained in the course of the ensuing year.

Capt. S. is sending to our Museum some fine skins of Yak, Barral, Musk Deer and Thar in their winter coats. A subsequent letter gives the following dimensions for the Yak.

"The Yak is a good specimen though not so large as two I shot in 1859, both of which were within an inch of eighteen hands. This skin was never pegged out and has of course shrunk very much. The dimensions of the animal which I took as well as I could when he was lying dead are as follows. I had only two men with me and we could not turn him over to measure him *very* correctly, but you may look upon the following as tolerably correct. I had a measuring tape with me:—

|                             |                        |                   |                          |
|-----------------------------|------------------------|-------------------|--------------------------|
| Nose to between horns,      | 27 inches,             | girth round belly | 8 feet.                  |
| Circumference of do.        | 15 do.                 | do.               | chest $7\frac{1}{2}$ do. |
| Length of do.               | 30 do.                 |                   |                          |
| From horns to root of tail, | 87 do.                 |                   |                          |
| Length of tail,             | 40 do.                 |                   |                          |
| Between eyes,               | 15 do.                 |                   |                          |
| Height                      | $16\frac{1}{2}$ hands. |                   |                          |

"I spent twenty days in Thibet in October, I crossed the pass on 30th September, and returned by another pass on 21st October. For the first fifteen days, I met no one and could have gone half way to Lassa. I then sent to Daba for some things, and about twelve or fourteen men came out, as usual, to watch me. I heard that a proclamation had been issued at Lassa during the previous winter opening the country to all foreigners, but that it had been cancelled



by another proclamation issued in April. I also heard of Blakiston's party which I was told had been turned back from the Thibet frontier.

It was awfully cold in Thibet in October, and I did not go very far, as I had a very bad set of Bhootiah servants with me. I spent the twenty days principally in shooting, though I frequently could not go out on account of the cold-cutting wind. It was always freezing day and night, and I was snowed up in my tent for two days, and on the 20th October, the morning before I crossed the pass on my return, the thermometer outside my tent was 3° below zero: next morning 4° above zero: I had some first-rate sport, killing altogether fifty-three head of large game in two months eleven days; two wild yak bulls, four Oves Ammon, twenty burral, twenty-one thar, three musk deer, &c., &c. I had great difficulty in getting Bhootiahs to go with me on account of the cold, and they were all busy and preparing to go down to the plains with their borax, &c. and I had no one with me who could prepare heads and skins well. One of my baggage animals fell off a bridge into the Doulee, and neither it nor the load it carried was ever seen again. On one side was a wild yak skin, and on the other all my bedding and clothes; everything was lost except what I had on at the time. I managed to buy some second-hand blankets, &c. and a native comb."

PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,

FOR AUGUST, 1861.

---

The Monthly General Meeting of the Asiatic Society of Bengal was held on the 7th instant, A. Grote, Esq., President, in the chair. His Excellency the Governor General was present.

The proceedings of the last meeting were read and confirmed.

Presentations were received :—

1. From Major G. G. Pearse, the following Historical Persian MSS :—

History of the Gukkur race of Hazara, the Punjab and Kashmir, and the supposed descendants of the Satrap of Cyrus the Great. History of Kashmir. History of the district of Hazara.

2. From Mrs. Brandis, of Rangoon, a copy of Voigt's *Hortus Suburbanus Calcuttensis*.

3. From Bábu Sivaprasád, a copy of his little work on the adaptation of the Roman alphabet to Hindi and Urdu.

4. From Col. Phayre, a wooden looking-glass frame of Burmese manufacture.

5. From T. P. Larkins, Esq., Magistrate of Bograh, a gold coin of rare execution and debased metal of the Gupta series.

6. From Capt. Bates, of the Punjab Infantry, through Lieut.-Col. Thuillier, a Chinese cross bow.

7. From Mr. J. Obbard, a box containing a few Chinese copper coins and some specimens of poisonous beans.

The following note accompanied the presentation :—

“TO W. S. ATKINSON, ESQ.,

*Secy. Asiatic Society.*

“DEAR SIR,—I beg to forward herewith a small box containing twelve specimens of what is said to be a poisonous bean picked up at

Pekin, and the same as that with which an attempt was made to poison the water-tanks and wells in the vicinity of the allied troops. I do not, of course, vouch for this, but one of the beans has been found to kill a dog.

"There are also in the box twelve coins picked up at the same place. These are probably very common, though unknown to me, but on the chance of their being acceptable to the Society, I beg to forward them to you and remain

"Your's truly,

"(Sd.) J. OBBARD."

*August 3rd, 1861.*

8. From Dr. T. Anderson, copies of his works on the Ceylon Acanthaceæ and on the flowering plants of Aden.

9. From Mr. T. F. Peppé, three fragments of the meteorite which fell on the 12th May at Peprassee and Bullooah on the borders of the Sarun district.

Mr. Peppé writes as follows:—

*Patna, 12th July.*

"A. GROTE, Esq.

"DEAR SIR,—I have the pleasure to send you some further notes regarding the aërolite which fell on the 12th May last, together with three pieces of it. The larger specimen was obtained from the village of Peeprassee, while the two smaller were obtained from a village called Bullooah, about three miles distant from the former, and I would particularly call your attention to the interesting fact that the smaller pieces exactly fit on to one side of the larger piece. This might, I imagine, give some clue to the height above the earth where the explosion took place, and it also shows from the fact of the fractured edges not being oxidised, that the greatest heat (which I take to be the oxidising agent) had been obtained prior to the explosion.

"There is also a singular vein observable in this specimen, which I think note-worthy; it looks as if a fracture had taken place and had been re-cemented again.

"I have ascertained that it does not decrepitate when heated before the blow-pipe, but it is readily oxidised, forming a glistening black surface exactly resembling the black crust at present covering the outside surface of the specimens.

“The polished surface does not show the Weidmanstättian figures, probably from the surface being at the wrong angle, but the particles of native iron are arranged in a reticulated or cellular manner.

“The depositions of the men who first saw the specimens forwarded are as follows :—

“Regarding the larger specimen, Bunnoo Bin Athert says :—

“‘On Sunday, the 12th May, as I was sitting in a field in company of a number of villagers, we were startled by three loud reports which were succeeded by a rumbling sound which gradually died away. We were on the East side of the village, and our attention was immediately attracted by a cloud of dust which rose from the ground at a distance of 15 biggahs from us. There was nothing seen to fall, but there was a whistling sound something like that which accompanies a bullet, but much louder. We rushed to the spot and found the stone exactly in its present state as far as I can judge. The ground had been thrown out all round it for about two feet. For two days nobody touched it, as it was said to be Mahadeo. A faqueer then brought it to the place near the village from whence your servant, 15 days after, took it away. There was no cloud at the time, and it was very hot and calm. Every one was very much frightened and the cattle all ran away.’

“With regard to the other two pieces from Bullooah, Ruder Moosuhar says,

“‘On the 12th May as I was taking the cattle to water I was startled by three very loud reports, and saw a light high up in the air which fell to the ground within three biggahs of where I was, I went up to the place from whence the sand had been raised up from the ground, and found five pieces of stone. They were very hot, and the sand all round was the same and thrown up all round there to the depth of a foot.

“‘There was a very small cloud where the report came from; it was otherwise clear, calm, and extremely hot. I was very much frightened, and sat down, being afraid to move.’

“On being further questioned, he said :—

“‘First there was the loud report and about the same time I saw the light, like a flame; then the stone fell; whilst falling it made a great noise, and after falling the sand was taken up high into the sky.’



"I have heard nothing further of the pieces which went to Goruckpore, but hope that you may have heard something of them yourself.

"Your's truly,

"(Sd.) T. F. PEPPE."

The following letter received from the Magistrate of Goruckpore, announces the despatch of other fragments of the same fall for the Society's Museum.

"TO THE SECY. ASIATIC SOCIETY,

Calcutta.

"SIR,—In reply to your letter No. 221, dated 11th June, 1861, I have the honour to inform you that I have this day forwarded the stone alluded to in a separate parcel by steamer.

"On the 12th May, 1861, at 5 P. M., the above stone and another piece, fell near Thanna Nimbooh situated at a distance of 42 miles North and East of this station.

"The fall of the stones\* was attended with a great noise similar to that of cannon fire. The distance apart at which they fell was two miles, and on their fall they penetrated into the ground one cubit and half a cubit respectively, and an appearance of smoke was seen by the people to issue from the spot. After an interval of two hours a storm ensued, and it rained a little. At the time of the fall of the stones it is reported that the sky was clear.

"I have, &c.

"(Signed) F. M. BIRD,

"Magistrate."

Goruckpore, 5th July, 1861.

Read the subjoined letter from Col. Sir G. Everest, on his election as an Honorary Member :—

To the Secy. Asiatic Society.

June, 25th, 1861, Hyde Park, W.

"DEAR SIR,—I have been prevented by indisposition and divers other causes, from earlier acknowledging the receipt of your letter of the 19th November, 1860, which duly reached me.

"I beg the favor of you to present to the Asiatic Society of Calcutta my respectful compliments and thanks for the honour they

\* Both stones are sent by steamer.

have been pleased to confer on me, and for the very flattering terms in which they notice my humble labours in the prosecution of the Great Trigonometrical Survey of India.

“It must never be forgotten that by their publication in the proceedings of the Asiatic Society of Calcutta, the labours of my honoured predecessor, Colonel Lambton, first attracted the notice of the scientific world. Indeed, but for the patronage of that learned and eminent body, those celebrated operations might for ever have remained in obscurity ; wherefore the gratitude and respect of myself and all connected with the Department of which I was for many years the chief, are especially due ; and I request you will express for me to the Society how deeply I am and always have been impressed with this sentiment.

“I have, &c.

“(Signed) GEORGE EVEREST.”

Nawab Mohammed Khazim Ali Khan Bahadur, of Rampore, was balloted for and elected an ordinary member.

The following gentlemen were named for ballot at the next meeting :

Captain A. R. Fuller, Director of Public Instruction, Punjab ; proposed by Lieutenant-Colonel Maclagan, seconded by Mr. H. S. Reid.

Dr. Clement Williams, H. M.'s 68th Regiment, Thyet Myo, proposed by the President, seconded by Mr. Oldham.

Babu Shumbhoo Chunder Roy, Zemindar of Rungpore ; proposed by Babu Rajendra Lal Mitra, seconded by Mr. Atkinson.

Major P. Stewart, Bengal Engineers ; proposed by the President, seconded by Col. Yule.

J. F. Cockburn, Esq., C. E. ; proposed by Mr. Wilson, seconded by Mr. Oldham.

A. Tween, Esq., Geological Survey ; proposed by Mr. Oldham, seconded by Mr. Medlicott.

Nawab Saiyid As'ghurally Khan Bahadur, of the Chitpore family ; proposed by Moulvi Abdul Lutif Khan Bahadur, seconded by Mr. Atkinson.

Captain E. Davidson, Engineers ; proposed by the Ven'ble Arch-deacon Pratt, seconded by Lieut-Colonel Scott.

L. Griffin, Esquire, C. S.; proposed by Mr. Cowell, seconded by Mr. Atkinson.

Lieut R. C. Beavan, late 62nd B. N. I.; proposed by Mr. Atkinson, seconded by the President.

Communications were received :—

1. From the Under Secretary to the Government of India, copies of two letters from the Bombay Government, with reports on the eruption of a volcano on the African shore of the Red sea.

2. From Babu Radha Nath Sikdar, abstracts of Meteorological Observations taken at the Surveyor General's Office in January last.

3. From Mr. W. T. Blanford, contributions to Indian Malacology, No. II. by Messrs. W. T. and H. F. Blanford.

4. From Mr. E. Blyth, a paper containing Zoological notices and extracts.

5. From Colonel A. P. Phayre, a memo. on the countries between Thibet, Yunan and Burmah, by the Very Rev. Thomine de Mazure, Vicar Apostolic of Thibet.

Lieutenant-Colonel Yule read the paper communicated by Col. Phayre, Commissioner of Pegu, being a letter from T. de Mazure, Vicar Apostolic in Thibet, residing at the mission establishment of Bonga in a valley of the mountains separating the Loo-kiang from the Lantsang-kiang, in the extreme S. E. corner of Thibet, to the Right Rev. Bishop Bigandet, Vicar Apostolic in Pegu and Ava.

The Rev. Vicar Apostolic's letter was dated 9th August, 1859, and took about 10 months to reach Rangoon. The route by which it came was not stated.

He described the position of Bonga as above given, in about lat.  $28^{\circ} 15''$ , and gave various particulars regarding the rivers flowing to the South. Commencing with the Loo-kiang called by him Lout-skiang and going westward he mentioned the Kouts-kiang which appears from his description to be the Shweli, a tributary joining the Irrawadee below Bhamo, the Kanpo-dzanbo and the great Yarou-dzanbo, which he had no hesitation in identifying with the Irrawadee. He also mentioned Same, the village where the French fathers Krick and Boury were murdered in 1855, as only seven hard days' travelling west of Bonga. The letter concluded with a short description of a number of wild tribes in that region.

Col. Yule commented at some length on the paper. He pointed

out that it was necessary to distinguish, if possible, between what the Rev. Vicar Apostolic knew by personal observation or inquiry, and what was merely preconception derived from the maps in his possession. He showed that he was completely imbued with the notions regarding the rivers of Thibet which are set forth in the maps of Klaproth, and in Berghaus's map of Further India (1843), and was misled by these. The reasons for entirely rejecting the identity of the great Dzanbo and the Irrawadee were given shortly. The very fact that he attributed the locality of the murder of Krick and Boury to the banks of a river running into the Irrawadee was shown to disprove his notions, as the locality of that murder was known to be near the great Dihong in the Mishmi country. It was singular that the only common basis of geographical knowledge between British India and the Thibetan missionary should be the tragical murder of those two reverend fathers.

Major Dalton, formerly principal Assistant Commissioner at Lukhimpoor in Upper Assam, who was present at the meeting, then made some very interesting remarks from his intimate knowledge of that country and the tribes surrounding it. He corrected Colonel Yule's belief that the Missionaries had been murdered near the Dihong. They were actually on their way into Thibet by the route of the real or eastern Brahmaputra (above the Brahmakoond) and had reached a Thibetan village where they stopped some time, when they were murdered by Kesa a Mishmi chief.

Colonel Yule pointed out that this was a most valuable correction, and much more easily reconciled with the distance from Bonga on the Loo-kiang stated by M. de Mazure. It seemed to prove also that the Gakbo-dzangbo of the maps, the Kanpo of M. de Mazure, and the Kenpou of d'Anville was actually the eastern Brahmaputra.

Major Dalton mentioned that the hill people about the Dihong were uniform in their statement that the river came from Thibet. That river and the eastern Brahmaputra were the only rivers of Assam, they generally maintained, that did come from Thibet. He also mentioned a curious tradition among the people that some centuries ago the Dihong did not exist, but appeared suddenly in vast irruption through the mountains.

He spoke with authority on the subject of the murdered missionaries as the arrangements that led to the capture of the murderer

were made by him. He had been well acquainted with the two murdered men.

The Officiating Librarian submitted the usual monthly report.

#### LIBRARY.

The Library received the following additions since the last meeting.

#### *Presented.*

The Acanthaceæ of Ceylon.—BY DR. T. ANDERSON.

The Flowering plants of Aden.—BY THE SAME.

The Vividhārtha Sangraha, No. 74.—BY BABU KALIPROSANNO SINGH.

The Calcutta Christian Observer for July and August.—BY THE EDITOR.

History of Kashmir in Persian.—BY MAJOR G. G. PEARSE.

History (in Persian) of the Gukkur race of Hazara, the Panjab and Kashmir and the supposed descendants of the Satrap of Cyrus the Great.—BY THE SAME.

History of the district of Hazara, also in Persian.—BY THE SAME.

Journal Asiatique, Tome XVII. No. 66.—BY THE PARIS SOCIETY.

Natuurkundig Tijdschrift voor Nederlandsch, Deel XXII.—BY THE BATAVIAN SOCIETY.

Oriental Baptist for July.—BY THE EDITOR.

Oriental Christian Spectator for May.—BY THE EDITOR.

Proceedings of the Royal Geographical Society of London, Vol. 5, No. 2.—BY THE SOCIETY.

Proceedings of the Academy of Natural Sciences of Philadelphia.—BY THE ACADEMY.

Quarterly Journal of the Geological Society of London, Vol. 18, No. 66.—BY THE SOCIETY.

Report of the Bengal Chamber of Commerce from Nov., 1860 to April, 1861.—BY THE CHAMBER.

Second Report of the Municipal Commissioners of Calcutta.—BY THE COMMISSIONERS.

Selections from the Records of the Government of India (Foreign Dept.) Nos. 30, 31.—BY THE GOVERNMENT OF INDIA.

Selections from the Records of the Madras Government, No. 70.—BY THE MADRAS GOVERNMENT.

Theoretical Consideration and Tables in reference to Indian Hypsometry, being Part 1 of Vol. II. of the work on India and High Asia.—BY MESSRS. DE SCHLAGINTWEIT.

Roman Characters, being a pamphlet on the adaptation of the Roman Alphabet to Hindi and Urdu.—BY BABU SIVAPRASA'D.

Voigt's Hortus Suburbanus Calcuttensis.—BY MRS. BRANDIS.

Indische Studien, Vol. 5, Part 1.—BY DR. WEBER.



*Exchanged.*

The Athenæum for May, 1861.

The Philosophical Magazine for June, with Supplement.

*Purchased.*

The Annals and Magazine of Natural History for June, Vol. 7, No. 42.

The American Journal of Science and Arts, for May, 1861, Vol. 19, No. 93

Comptes Rendus, Tome LI. Nos. 17 to 20 with Index of Tome LI.

Motanabbii Carmina cum Commentario Wahidii, Part V.

The Literary Gazette, Nos. 151 to 154.

Revue des Deux Mondes for 15th May and 1st June, 1861.

Revue et Magasin de Zoologie, No. 4 of 1861.

Turner's Embassy to Thibet.

Indische Studien, Vol. 5, Part 1.—By Dr. A. Weber.

On the Study of Sanskrit in relation to Missionary work in India, *pamphlet*.

—By Monier Williams.

LALGOPAL DUTT.

FOR SEPTEMBER, 1861.

The Monthly General Meeting of the Asiatic Society of Bengal was held on the 4th instant.

A Grote, Esq., President, in the chair.

The proceedings of the last meeting were read and confirmed.

Presentations were received—

1. From Prince Mohammad Jalaluddeen, two specimens of silver coins of his grandfather Tipu Sultan; they bear date 1216 Scil æræ novæ, 1787-8 A. D.

2. From the Director of Public Instruction, Bombay, copies of Bombay Government Selections No. 63 and "statement exhibiting the external trade of Sind for 1859-60."

3. From Babu Hitalál Misra, a copy of his edition of the Râma Gîta in the Adhyâtma Râmâyana of Brahmânda Purâna.

4. From Mr. J. Obbard, a specimen of Iron Pyrites found in the Coast Battery excavations in Shakespear's Cliff at Dover.

5. From the Principal Grant Medical College, a copy of the Report of the College for 1860-61.

6. From Lieut W. P. Fisher, Dera Ismael Khan, the jaws and tongue preserved in spirit, and skin of a lizard supposed to be the *Biskopra*.

Read the following note from Mr. Obbard about the recent Comet:—

*To the Secy. Asiatic Society.*

DEAR SIR,—Herewith I have the pleasure to enclose a sketch of the track of the Comet of July last.

On the 7th of July, I received through the kindness of the President a telegram which he had received from Benares. Up to that time, I had not seen the Comet, and consequently had lost the opportunity of observing it during the most useful and brilliant period of its passage.

It was moreover very vexatious that from the nature of my duties at the time, I was unable to obtain any shore observations.

The following data therefore from which the track has been drawn, are mere sextant measurements,—which have all been reduced in the sketch to the hour of 9. P. M. for the sake of uniformity. The limit of error, may be calculated at from 15'' to 4' of arc according to the state of the weather. But as nothing more elaborate seems to have been forwarded to the Society, I am emboldened to submit these, as they may prove interesting, though not sufficiently accurate for scientific purposes.

*Abstract of the measured positions of the Comet of July, 1861, referred to the stars in the constellation of Ursa Major.*

| Date. | Hour. | Star.      | Mean Angle. | Hour. | Star.  | Mean Angle. | Direction of Tail from                                    |
|-------|-------|------------|-------------|-------|--------|-------------|-----------------------------------------------------------|
|       | h. m. |            | ° ' "       | h. m. |        | ° ' "       |                                                           |
| 8     | 8 27  | $\gamma$   | 13 33 40    | 8 34  | $\eta$ | 13 15 47    | $\alpha$ .                                                |
| 9     | 9 30  | $\gamma$   | 15 06 50    | 9 15  | $\eta$ | 11 14 40    | Midway between $\alpha$ and $\beta$ .                     |
| 10    | 9 00  | $\gamma$   | 16 40 00    | 9 22  | $\eta$ | 9 43 45     | Between $\alpha$ and $\beta$ , one-fourth from $\alpha$ . |
| 11    | 9 00  | $\gamma$   | 17 59 00    | 8 58  | $\eta$ | 8 46 30     | As yesterday, parallel to $\delta \epsilon \zeta$ .       |
| 12    | 9 05  | $\gamma$   | 19 12 10    | 9 14  | $\eta$ | 8 06 34     | As yesterday.                                             |
| 13    | 8 33  | $\beta$    | 26 23 27    | 8 25  | $\eta$ | 7 50 10     | As yesterday.                                             |
| 14    | 8 40  | $\alpha$   | 26 04 50    | 8 31  | $\eta$ | 7 44 10     | Midway between $\alpha$ and $\beta$ .                     |
| 15    | 8 24  | $\epsilon$ | 13 20 40    | 8 18  | $\eta$ | 7 48 30     | $\beta$ .                                                 |
| 16    | 8 33  | $\alpha$   | 28 02 50    | 8 26  | $\eta$ | 7 59 40     | $\beta$ .                                                 |

## REMARKS.

- (a.) Length of visible tail to the naked eye  $12^{\circ} 12'$ .  
 (b.) Visible tail  $27^{\circ} 50'$ ; clear night.  
 (c.) Visible tail  $12^{\circ}$ .  
 (d.) Nucleus less bright but looming as large.  
 (e.) Visible tail  $8^{\circ}$ .  
 (f.) Visible tail  $6^{\circ}$ ; cloudy night, the worst observations of the series.  
 (g.) Visible tail  $6^{\circ}$ ; comet generally much more indistinct.  
 (h.) Visible tail  $3^{\circ}$ ; very faint and difficult to observe.  
 (i.) Little or no tail, clear night.

Latitude 21-51—45 N. } N. B.—Mean Time was used through-  
 Longitude 88-08—15 E. } out. The centre of the Nucleus was  
 always measured.

In another letter Mr. Obbard describes the appearance of another Comet observed in the Southern Hemisphere. He states—

“I beg to draw the attention of the Society to the following report of a Comet having been observed in the Southern Hemisphere, which has not, to the best of my knowledge, been noticed before. The extract for which I am indebted to Captain Hill, first Assistant to the Master Attendant, is copied *verbatim* on the other side, with this exception, that the correction for variation of the compass has been applied to convert the magnetic into true bearings. The speed with which the Comet must have travelled through the heavens appears most extraordinary, but from the entire absence of observations, the following report will only serve as a mere record of its appearance.

American Ship *Rival*, F. Hatch, Master, from Liverpool, bound to Calcutta, 1861.

*May 30th*, 5 A. M.—Saw a beautiful Comet bearing South South East. True-judged altitude  $10^{\circ}$ , latitude  $25^{\circ} 32'$  S., longitude  $22^{\circ} 53'$  W.

*June 14th*.—Saw it again at 4 A. M., bearing East, Latitude  $38^{\circ} 08'$  S., Longitude  $19^{\circ} 26'$  E., measured altitude  $19^{\circ} 25'$ .

*June 16th*.—At 4 A. M. saw it again bearing N. E. by E., judged altitude  $30^{\circ}$ , the tail  $15^{\circ}$  long and a little curved.

*June 28th*.—At about 3-30 A. M. saw it again. Latitude  $33^{\circ} 01'$  S., Longitude  $62^{\circ} 13'$  E., the tail much bushed (?). It was very cloudy all the time and stormy with a heavy sea.”

The following gentlemen duly proposed at the last meeting were balloted for and elected ordinary members :—

Captain A. R. Fuller; Dr. C. Williams; Baboo Shumbhoo Chunder Roy; Major P. Stewart; J. F. Coekburn, Esq., C. E.; A. Tween, Esq., Nawab Saiyid As'ghur Ali Khan; Captain E. Davidson; L. Griffin, Esq., C. S. and Lieut. R. C. Beavan.

The following gentlemen were named for ballot at the next meeting :—

Sahebzadah Mohammad Walagohur of the Mysore family, proposed by Moulvi Abdul Lutf Khan Bahadur, seconded by Mr. Cowell.

Moonshi Suderooddeen of Pandooah, proposed by Huzrut Shah Kabiruddeen, seconded by the President.

Communications were received—

1. From the Under-Secy. to the Govt. of India in the Foreign Dept., a copy of a letter from the Bombay Government containing a report in continuation on the eruption of a Volcano on the African shore of the Red Sea.

2. From Babu Radha Nath Sikdar, Abstracts of Meteorological Observations taken at the Surveyor General's office, in February and March last.

Sir B. Frere read the following extracts from letters from Major Sarel, announcing his return from the expedition which started up the Yang-tse-Kiang in February last with the object of reaching India through Thibet :—

Extract from an official letter from Lieut.-Col. Sarel, 17th Laneers, dated Shanghai, China, 18th July 1861, to Colonel Haythorne, Adjutant-General H. M.'s Forces, Calcutta.

"I have the honor to report my return to Shanghai with the N. C. officer and men of the 11th Punjab Infantry.

"Sir Hope Grant granted me leave to take these men and to endeavour to proceed to India viâ Thibet, in February last, at the same time telling me that he would write to India to inform H. E. the Commander-in-Chief that I had obtained leave of absence.

"I regret to have to state, that the expedition has proved unsuccessful so far as the route through Thibet is concerned, our party penetrated 1800 miles into the interior and then found the country so overrun with rebels, that no men could be induced to accompany us, and no carriage of any sort was procurable; the towns-people in

one place fired upon us, and though they could not have prevented our proceeding, it became evident, that no one would be allowed to accompany us, and we were compelled to return.

“We have mapped the Yang-tse-Kiang for a thousand miles higher than any Europeans had ascended, and collected all the information possible relative to the commerce and rebels of Western China.

“The native soldiers before alluded to have been of the greatest service and their conduct has been most excellent; I beg to be allowed to bring them to His Excellency’s notice.

“(Sd.) H. A. SAREL,

“*Capt. and Bt. Lieut.-Colonel, 17th Lancers.*”

Extract from a private letter from Lieut.-Col. Sarel, dated 18th July, Shanghai, China, to Col. Haythorne, A. G. :—

“I am sorry to have to report my return from the west of China; I fully expected that our party would have been the first to penetrate across from China to India, and if it had not been for the rebels in the west, I think we should have had no difficulty.

“The mandarins evidently suspected us of being in league with the rebels, though we had passports and a mandarin with us. I do not think the mandarins who accompanied us, were of much service to us, as they were unwilling to peril their heads among the rebels, but even if the authorities had been anxious to help us, I think no orders of their’s would have induced the coolies to go with us; the western rebels are not connected with your Canton friends, the Taipings, but are large bands of robbers collected under four or five different leaders; the idea of the Yang-tse-Kiang being navigable to the west, must, I think be given up, though coal is to be had in any quantities.

“(Signed) H. A. SAREL.”

Mr. Cowell read a short account of a paper by M. Klaproth on the paper currency of China, as an Appendix to a paper on the subject of Asiatic paper currency, read by him before the Society last year.

The officiating Librarian submitted the usual monthly report.

#### LIBRARY.

The following additions were made to the Library since the meeting in August.

#### *Presented.*

Report of the Grant Medical College for 1860-61.—BY THE COLLEGE.

Rāma Gīta.—BY BABU HITALA’L MISRA.



The Indian Annals of Medical Science, No. XIV.—By THE EDITORS.

Journal of the Statistical Society of London for June, Vol. XXIV. Part 2.

—By THE SOCIETY.

Journal of the Royal Asiatic Society of London, Vol. XVIII. Part 2. and Vol. XV. Part 1.—By THE SOCIETY.

Statements exhibiting the External Trade of Sindh for 1859-60.—By THE DIRECTOR OF P. INSTRUCTION, BOMBAY.

Madras Journal of Literature and Science, New Series, Vol. VI. No. 11.

—By THE MADRAS ROYAL ASIATIC SOCIETY.

Oriental Baptist for August.—By THE EDITOR.

Oriental Christian Spectator for June.—By THE EDITOR.

Selections from the Records of the Bombay Government, No. 62.—By THE BOMBAY GOVERNMENT.

Selections from the Records of the Government of India (Foreign Dept.) No. 32.—By THE GOVT. OF INDIA.

Zeitschrift der Deutschen Morgenlandischen Gesellschaft, Vol. 15, Part 2.

—By THE SOCIETY.

### *Exchanged.*

The Athenæum for June, 1861.

The Philosophical Magazine for July, No. 144.

### *Purchased.*

The Annals and Magazine of Natural History for July, Vol. 8, No. 43.

Annales des Sciences Naturelles—Botany, Nos. 5 and 6; Zoology, Nos. 2 to 6.

Kritische Grammatik der Sanskrita Sprache.—By F. Bopp.

The French Translation of the Bhagabadgita.—By E'mile Burnouf.

Comptes Rendus, Tome LII. Nos. 21 to 24.

Dozy's Histoire des Musulmans D'Espagne, Vols. 1 and 2.

The Edinburgh Review for July, No. 231.

Journal des Savants for May, 1861.

Vikramorvaçī of Kālidāsa, translated into French by P. E. Foucaux.

The Literary Gazette, Nos. 155 to 159.

Letellier's Les Lois de la Parole.

Martin's Civilisations Primitives en Orient.

Natural History Review for July, No. 3 of 1861.

Neumann's Ostasiatische Geschichte.

Revue des Deux Mondes for 15th June and 1st July, 1861.

Revue et Magasin de Zoologie, No. 5 of 1861.

Reeve's Conchologia Iconica, Parts 208 and 209.

The Westminster Review for July, 1861.

Wahrmund's Handbuch der neu-Arabischen Sprache.

Zamakhsario's Al-Mufussal, edited by J. P. Broch.

المقصل في العجوة العلامة الزمخشري

LALGOPAL DUTT.

### FOR OCTOBER 1861.

The monthly general meeting of the Asiatic Society of Bengal was held on the 2nd instant.

Babu Rájendralál Mitra, Vice-President, in the chair.

Presentations were received—

1. From the Secretary to the Government of India, Public Works Department, a copy of Colonel Sir P. T. Cautley's report on the Ganges Canal.

2. From Mr. J. Obbard, some genealogical tables (in Persian) of the principal Mahomedan saints, and of the Arsacidan and Sassanian dynasties.

3. From His Excellency the Governor-General, two sandstone sculptures (one of them a little mutilated) representing Buddha, found among the remains of Kurun Bil near Jubbulpore.

4. From F. M. Bird, Esq., Magistrate of Goruckpore, two fragments of the meteorite which fell on the 12th May last, at a distance of 42 miles N. and E. of his station; the larger weighing above 45½ lbs. avoirdupois.

Read the following letter from Mr. J. Obbard, containing some further particulars of the comet described in his former communication :—

E. B. COWELL, Esq.,

*Secy. Asiatic Society.*

“SIR,—On the last meeting of the Asiatic Society, I had the pleasure of forwarding you an extract from the log of the American ship *Rival*, recording the appearance of a strange comet in the Southern hemisphere.

“From another paper which I have received this day, there can be no doubt that this comet is one and the same with that which has been observed in the Northern hemisphere, but that it was observed

previously to its crossing the plane of the earth's orbit. It is to be hoped that accurate observations may yet reach us from the Cape or Mauritius.

I remain, &c.,

“(Sd.) J. OBBARD.”

The enclosed extract is from the log of the British ship *Saladin*, Captain James Baillie, and I am indebted for it also to Captain Hill, First Assistant Master Attendant.

8th June, 1861.—Ship lat.  $40^{\circ}$  S., long.  $10^{\circ}$  E. at 5 A. M. a fine Comet visible to the eastward, alt. about  $40^{\circ}$ . Nucleus equal to star of second magnitude; consider its R. A. 4h. and Dec.  $33^{\circ}$  S., it bearing about  $34^{\circ}$  N. N. E. from Canopus and  $37^{\circ}$  N. W. by W. from Eridani Depernon.

22nd June.—Comet moved to N. W. Eastward and increased in size to double that of Jupiter. Its tail  $50^{\circ}$  to  $60^{\circ}$  long but partly absorbed in moon's light. R. A. about 4h. 30m.; Dec. about  $15^{\circ}$  S.; from Canopus about  $44^{\circ}$ , and Eridani  $53^{\circ}$ . Ship's lat.  $38^{\circ}$  S., long.  $62^{\circ}$  E.

27th June.—Comet now passing through constellation Orion and two-thirds as large, apparently, as the full moon. R. A. about 5h. Dec.  $7^{\circ}$  N., bearing  $4^{\circ}$  or  $5^{\circ}$  from Bellatrix and about  $13^{\circ}$  from Aldeberan, evidently travelling fast to the N. N. East. Ship's lat.  $30^{\circ}$  S., long.  $77^{\circ}$  E.

Memo.—Did not see it again as it merged into the rising Sun's rays.

But on the evening of 5th July in lat.  $5^{\circ}$  S., long.  $83^{\circ}$  E., saw what I imagine to be the same brilliant comet, about  $6^{\circ}$  N. N. E. of the Northernmost pointer, “Dubhe;” truly, a grand object, and seen at the same time as Venus, (near the setting sun) Jupiter, and Saturn, but much larger than either.

6th July.—Comet moved into such a position as would be taken by the hat of the celestial “Waggoner of Charles' Wain.”

The following is an extract from the *Cape Argus* newspaper of the 4th June :—

Comet observed at 5 A. M. of the 3rd June on the Eastern horizon, Right Ascension, 3h. 58m. 30s. South Declination,  $30^{\circ} 10'.$

It now equals a star of  $2\frac{1}{2}$  magnitude, and has a tail of  $3^{\circ}$  in length inclined to the South pole.

The following gentlemen duly proposed at the last meeting were balloted for and elected ordinary members :

Sahcbzadah Mohammad Walagohur of the Mysore family, and Moonshi Sudder-oo-ddeen.

The following gentlemen were named for ballot at the next meeting :—

Captain M. Lloyd, Deputy Commissioner of Tounghoo, proposed by Lieutenant-Colonel A. P. Phayre, seconded by Mr. Atkinson.

R. H. Davies, Esq., Secretary to Punjab Government, proposed by Lieutenant-Colonel Maclagan, seconded by Mr. D. F. Macleod.

The Council recommended that Mr. F. E. Hall's proposal be accepted to edit in the *Bib. Indica* the *Sánkhya Sára* by Vijnána Bhikshu, and the *Nátya S'ástra* of Bharata ; each work will occupy one fasciculus. The former is an important treatise on the Sánkhya philosophy. The latter is part of Bharata's very rare work, which, though often quoted by the old Hindú writers, Professor Wilson believed to be no longer extant—(Hindú Drama.—Introduction). Mr. Hall has never seen or heard of any besides his own single copy. The recommendation was adopted.

Communications were received :—

1. From Rev. Mr. Loewenthal, the following account of some of the sculptures in the Peshawur Museum.

The Peshawur Museum is gradually filling up with sculpture and haut-reliefs of Buddhist times, which are now and then found by the country people almost on the surface of the ground. The Buddhas, apparently, in every variety of size are almost innumerable. Then there are kings of various sizes, the ornaments of pearls and precious stones, on the head, neck, breast, and arms being usually the most elaborate parts of the figures. There is a lady sitting on a lion, playing the lute ; and other things. The haut-reliefs present every kind of scene—domestic, religious, warlike. There are interiors, apparently, of the harem ; there are scenes of worship and sacrifice ; there are elaborate figures of warriors in all kinds of dresses, sometimes purely Greek, sometimes purely oriental, sometimes a mixture of the two. There is one remarkable slab, lately brought from Nagram in Yusafzai, by Lieut. Short which might almost be a petrified Cartoon of the Punch of the period. That the artist meant it for a grotesque, the first glance is sufficient to convince one. The foreground of the

fragment—for it is only a fragment—is occupied by three figures; the one on the right, of a European cast of countenance, and clad like a Macedonian soldier; the helmet, however, being of a very peculiar shape. He is armed with a javelin and a short broad sword, and has a shield on his shoulder. The figure on the left is armed in a similar manner, a bow slung over his body being added, but has a turban instead of a helmet, and a heavy-folded *dhoti* under the tegulated armour which covers the abdomen. These two have pendant whiskers and moustaches, but the chin closely shaved. The middle figure has only a sword and a shield, and no armour; the dress consists of a *dhoti*, and a twisted cloth tied in the manner of a scarf across the nude thorax; the head is bare. The figure is smaller than the other two, and the features of the face are heavy and coarse. The rest of the slab is occupied by a number of men—as they seem to be, to judge by their limbs and by what is visible of their bodies, but with monkey faces of the greatest diversity of expression, and executed with much skill; no two are alike. Some loll out their tongue, some have tusks, one puts his fingers into the corners of his mouth to make a grimace, one has two faces on one neck, one has some animal's head as his own head-covering, one has a face on his chest, etc. They are armed with clubs and formidable looking knives. No mere description can give a correct idea of this or of any of the other sculptures. I shall try to obtain drawings or photographs of some of the best, and send them to you, if it is thought worth while. The execution of most of them is quite different from anything purely Hindu or Asiatic. Most of these things have been found accidentally in various parts of the Peshawur and Yusafzai valleys; some even within the cantonments of this place. Some pieces of pottery have also been found in the cantonment, stamped with figures of pure Greek designs. No systematic attempt at opening any of the mounds abounding in this region has yet been made, except by Lieutenant Johnston, Assistant Commissioner, who has been exploring one situated some two miles from the station; but little has as yet come to light, besides a copper urn, in the shape of a common water-jar, containing nothing but fragments of bones and some lamina of mica. He has, however, laid bare pavements and steps of burnt brick, and obtained a sufficient number of sculptured cornices, friezes, pediments, statues, ornaments, &c., etc., all in



fragments, to show that the mound covers the ruins of a splendid building, which was destroyed with the utmost violence and by fire; also sufficient evidence to show that the place was built by Buddhists and destroyed by Mahomedans, for faces of persons are often much mutilated; a few coins have also been found, one of them of the reign of Lysias. The Yusafzai district, however, would most likely repay the trouble of exploration; the expense need not be very great; and yet it is not likely that anything can be done unless Government or the Society make an appropriation of funds, as few officers with sufficient leisure stay long enough here to undertake explorations on their own account.

Inscriptions seem to be very scarce. There are two small stone urns in the Museum, one of which has an inscription.\*

Mr. G. D. Westropp of Rawal Pindee, also sent me, sometime ago, an account of a discovery made eighteen miles to the North West of that station, near Shah Ke Dehri of the following articles:—

1. A circular stone trough about one foot in diameter and three inches in depth, beautifully turned and polished; the outer shape is that of a truncated cone. "The trough has three grooved circles diverging from the base of a small cone which rises about  $1\frac{1}{2}$  inches from its centre." The vessel is about half an inch thick. The stone is of a dark green colour, interspersed with white spots, free from flaws or defects.

2. The trough contained a crystal figure inverted on the small centre cone, representing a duck with a turtle's head. It is delicately carved and in a state of good preservation. Within the figure there was a piece of gold leaf three inches by one, with an inscription, in relief and perfectly clear and distinct.

2. From Reverend Dr. W. S. Mackay "Notes on the Comet of 1861."

3. From Babu Rajendralal Mitra, a few notes with a translation of the Wardak inscription, and an account of Toramana.

4. From F. E. Hall, Esq., a paper on an inscription from Chedi.

5. From Lieutenant-Colonel Sarel, Notes on the river Yangtse-Kiang from Hankow to Pingshan.

6. From Babu Radhanath Sikdar, abstracts of Meteorological Observations taken at the Surveyor General's Office in April last.

\* This inscription is with Babu Rajendralal Mitra.

Lieutenant-Colonel Yule read a paper about some Indian remains in Java. His remarks were illustrated by drawings of several of the most interesting ruins, and he compared the style of their architecture with that of the Burmese temples and some of the temples in India.

Sir Bartle Frere made some remarks on some of the ruins in Sindh, which bore an analogy to these Javanese remains.

The thanks of the meeting were voted to Lieutenant-Colonel Yule for his very interesting communication, which will be inserted at length in the Society's Journal.

The Officiating Librarian submitted the usual monthly report.

#### LIBRARY.

The following books and periodicals were added to the Society's Library since the last meeting.

#### *Presented.*

The Annals of Indian Administration.—BY THE BENGAL GOVT.

Annual Report of the Geological Survey of India for 1860-61.—BY THE CALCUTTA GEOLOGICAL MUSEUM.

Archiv für Kunde Österreichischer Geschichts-Quellen, Vols. 24 and 25.—BY THE SOCIETY.

Almanach der Kais : Academie der Wissenschaften.—BY THE ACADEMY.

Abhandlungen der philosophisch-philologischen Classe, Academie der Wissenschaften, IX. Bd. I. Abth.—BY THE SAME.

Ditto ditto der Philosophie Classe, Vol. 36.—BY THE SAME.

Annual Report on the Administration of the Straits Settlement for 1860-61.—BY THE BENGAL GOVT.

Annual Report on the Administration of the Provinces of Oude for 1860-61.—BY THE SAME.

The Vividhartha Sangraha, No. 75.—BY THE EDITOR.

Bulletin de l'Académie Impériale des Sciences de St. Petersburg, Tome I. Nos. 3 to 9, Tome II. Nos. 1, 2 and 3.—BY THE ST. PETERSBURGH ACADEMY.

Calcutta Christian Observer for September, 1861.—BY THE EDITORS.

Report on the Ganges Canal.—By Col. T. P. Cautley, Vols. 1, 2 and 3 with a book of plates, &c.—BY THE GOVT. OF INDIA.

Denkschriften der Kais : Academie der Wissenschaften, Vol. X.—Philosophie Classe.—BY THE ACADEMY.

Fraser's Account of the Quinquina plantations in the Island of Java.—BY THE MADRAS GOVT.

Fontes Rerum Austriacarum, Vol. XX. Part 2.—BY THE VIENNA ACADEMY.

General Report on Public Instruction of the Lower Provinces of the Bengal Presidency for 1859-60.—BY THE DIRECTOR OF PUBLIC INSTRUCTION.

Gelehrte Anzeigen, Vols. 49, 50.—BY THE MUNICH ACADEMY.

Journal Asiatique, Tome XVII. Nos. 67, 68.—BY THE PARIS ASIATIC SOCIETY.

Journal of the Academy of Natural Sciences of Philadelphia, Vol. IV Part 4.—BY THE ACADEMY.

Jahrbuch der Geologischen Reichsanstalt Vol. XI. No. 1.—BY THE VIENNA GEOLOGICAL MUSEUM.

Descriptio Al-Magribi By M. De Goeje.—BY THE LUGDUNE-BATAVIAN ACADEMY.

Kitab ul Boldan Al-Jaqubii.—BY THE SAME.

Memoires de l'academie Imperiale des Sciences de St. Petersburg, Tome II. Nos. 1 to 7, Tome III. No. 1.—BY THE ACADEMY.

Memorie della Reale Accademia delle Scienze di Torino, Vol. XVIII.—BY THE ACADEMY.

Memoires of the Geological Survey of India, Vol. III. Part 1, with a map.—BY THE GEOLOGICAL MUSEUM.

Notice of the Origin, Progress and Present Condition of the Academy of Natural Sciences of Philadelphia, 1860.—BY THE ACADEMY.

Oriental Baptist for September.—BY THE EDITOR.

Oriental Christian Spectator for July and August.—BY THE EDITOR.

Proceedings of the Royal Geographical Society of London, Vol. V. No. 3.—BY THE SOCIETY.

Proceedings of the Royal Society of London, Vol. XI. No. 44.—BY THE SOCIETY.

Proceedings of the Royal Society of Edinburgh, Vol. IV. No. 50.—BY THE SOCIETY.

Proceedings of the Zoological Society of London from January to March, 1861.—Part 1.—BY THE ZOOLOGICAL SOCIETY.

Report on the Survey Operations of the Lower Provinces for 1860.—BY THE BENGAL GOVT.

Report on the Administration of the Madras Presidency for 1860-61.—BY THE SAME.

Report on the Administration of the Tenasserim and Martaban Provinces for 1860-61.—BY THE SAME.

Ditto ditto of the Provinces of Pegu for 1860-61.—BY THE SAME.

Ditto ditto of Hyderabad, Assigned Districts for 1860-61.—BY THE SAME.

Remarks on Native Education in India in a Psychological point of view.—BY DR. S. G. CHUCKERBUTTY.

Sitzungsberichte der Königl-Bayerl-Akademie der Wissenschaften zu München, Hefts 1 to 3 for 1860.—BY THE ACADEMY.

A Month in the Cotton Districts—being a visit in the Districts about Bursee. By W. C. Sillar.—BY THE AUTHOR.

Schriften der Königlichen Physikalisch—Ökonomischen Gesellschaft zu Königsberg Academie &c. Vol. 1, Parts 1 and 2.—BY THE ACADEMY.

Sitzungsberichte der Kais-Academie der Wissenschaften Philoso-Historio Classe, Vol. 32, Nos. 9 and 10, Vol. 33, Nos. 1 and 2, Vol. 34, Nos. 3 to 5, Vol. 35, Nos. 6 to 9.—BY THE ACADEMY.

Ditto ditto Mathematische Classe, Vol. 39, Nos. 1 to 6, Vol. 40, Nos. 7 to 12, Vol. 41, Nos. 13 to 20, Vol. 42, Nos. 21 to 26.—BY THE ACADEMY.

Transactions of the Royal Society of Edinburgh, Vol. XXII. Part 2, with an Appendix containing Markstoun observations, being a Supplement to Vol. XXII.—BY THE SOCIETY.

Transactions of the Zoological Society of London, Vol. IV. Part 2.—BY THE ZOOLOGICAL SOCIETY.

Transactions of the Government of India in the Military Department for 1860-61.—BY THE BENGAL GOVT.

Kongliga Svenska Fregatten Eugénies Resa, No. 7., Zoologi, No. 4.—BY THE AUTHOR.

Martins' Denkrede auf Alexander von Humboldt.—BY THE MUNICH ACADEMY.

Rede auf Sir Thomas Babington Macaulay. By Dr. G. Thomas von Rudhart.—BY THE SAME.

Verzeichniss der Mitglieder der K. B. Academie der Wissenschaften, 1860.—BY THE SAME.

Grenzen und Grenzgebiete der Physiologischen Forschung.—BY THE SAME.

Prof. Muller's Einleitende Worte zur des Feier Majestats des Königs Maximilian, II.—BY THE SAME.

*Exchanged.*

The Athenæum for July, 1861.

The Philosophical Magazine for August, 1861.

*Purchased.*

The Annals and Magazine of Natural History, Vol. 8, No. 44.

The American Journal of Sciences and Arts, Vol. XIX. No. 94.

Annuaire des Deux Mondes for 1860.

Annales des Sciences Naturelles, Vol. XIV. No. 1.

Burnouf's Methode la langue Sanserite.

Comptes Rendus, Tome LII. No. 25 and Tome LIII. Nos. 1 to 4.

Freytag's Einleitung in das Studium der Arabischen Sprache.

Journal des Savants for June and July, 1861.

The Literary Gazette, Nos. 160, 162 and 163.

The Quarterly Review for July, 1861.

Revue des Deux Mondes for 15th July and 1st August, 1861.

Revue et Magasin de Zoologie, Nos. 6 and 7 of 1861.

Sacy's *Mélanges de Littérature Orientale*, Par Le Duc de Broglie.

Zenker's *Bib. Orientalis*, Vol. II.

LALGOPAL DUTT.

#### FOR NOVEMBER, 1861.

The monthly General Meeting of the Asiatic Society of Bengal was held on the 6th instant.

Lieut.-Col. H. L. Thuillier, Vice-President, in the chair.

Presentations were received—

1. From Babu Rajendra Mullick, dead specimens of a Fallow Deer and a Cape Baboon.

2. From Mr. Cowell, a copy of Part I. of *Bhāmini Bilāsa*, edited by Pundit Jadu Nāth Mookerjee.

3. From the Surveyor General's Office, a new map of India, (small scale).

4. From Mr. J. J. T. H. Asphar, a small collection of shells, collected chiefly in Ceylon and Malta.

Read a letter from Major T. James, intimating his desire to withdraw from the Society.

The following gentlemen duly proposed at the last meeting were balloted for, and elected ordinary members:—

Capt. M. Lloyd, and R. H. Davies, Esq.

The following gentlemen were named for ballot at the next meeting:—

Major H. R. James, C. B., Commissioner of Peshawur, and M. Kempson, Esq., Principal of Bareilly College, proposed by Lieutenant-Colonel Maclagan, seconded by Mr. H. S. Reid.

C. B. Saunders, Esq., C. S., Judicial Commissioner at Bangalore, proposed by the President, seconded by Lieutenant-Colonel Thuillier.

Captain W. A. Ross, Bengal Artillery, proposed by Mr. H. F. Blanford, seconded by Lieutenant-Colonel Thuillier.

Communications were received—

1. From N. R. Pogson, Esq., F. R. A. S., Government Astronomer, Madras, a paper on the discovery of the New Planet "*Asia*."



2. From the Under-Secretary to the Government of India, Foreign Department, papers containing the translation of a report (sent through the Government of Bombay) of a visit to the volcano of Jebbel Dubbeh by a Somali named Hussein Arraleh.

3. From Babu Radha Nath Sikdar, abstracts of Meteorological Observations taken at the Surveyor General's Office in May last.

The Secretary read the two first papers.

Mr. Blanford read an abstract of his paper on the Spiti fossils. Commencing by stating that the collection of fossils described in the paper had been collected in the year 1828, by Dr. Gerard, since which time they had lain undescribed in the Society's Museum, Mr. Blanford proceeded to describe the portion of the fossiliferous rocks of the north flank of the Himálaya so far as it was known at present from the writings of M. Jaquemont and Col. Strachey. He noticed the discovery at the Niti Pass of fossils of the age of the Oxford clay by the latter, which fossils had been examined and pronounced upon by Professor Edward Forbes. M. Jaquemont had collected fossils also in the Spiti valley, but his collection still remained undescribed in the Museum of the Jardin des Plantes at Paris.

Dr. Gerard's collection from Spiti consisted chiefly of Cephalopoda. There were also a few Gasteropoda and Conchifera and one Echinoderm. The indications of age presented by the collection were, that while the majority were closely allied to or identical with fossils of the upper Lias and inferior Oolite of Europe, a minority were equally characteristic of Triassic, middle and upper Oolitic faunas, and one specimen, an Echinoderm, appeared to belong to a genus characteristic of the chalk. The inference to be drawn from those was, that while beds of Liassic or inferior Oolitic age certainly existed at Spiti, it remained open to future observers who visited Spiti to decide whether the other fossils were really from distinct formations, or indicated the co-existence in Asiatic Seas of animals which in Europe lived at distant periods of time. A member of the Geological Survey, Mr. W. Theobald, junior, had lately visited Spiti, and it was to be hoped that his investigations might decide the above point.

The thanks of the meeting were unanimously accorded to Mr. Blanford for his valuable paper.

The Officiating Librarian submitted the usual monthly report.

## LIBRARY.

The following are the accessions to the Library since the meeting held in October last.

*Presented.*

The Annual Report of the Geological Survey of India for 1859-60.—BY THE BENGAL GOVT.

The Calcutta Christian Observer for October.—BY THE EDITOR.

The Calcutta Review for June.—BY THE EDITOR.

Prison Returns of the N. W. Provinces for 1860.—BY THE GOVT. N. W. PROVINCES.

Botanical Descriptions of the Species of Cinchona now growing in India and China.—BY THE MADRAS GOVT.

Journal of the Statistical Society of London for September.—BY THE SOCIETY.

Journal of the Agricultural and Horticultural Society of India, Vol. XII. Part I.—BY THE SOCIETY.

Memoirs of the Geological Survey of India, Vol. II. Part II. and Vol. III. Part I.—BY THE BENGAL GOVT.

Map of India (small scale) showing Railway and Telegraph Stations.—BY THE SURVEYOR GENERAL OF INDIA.

Meteorological Observations for Hobart Town from 1841 to 1860.—BY THE ROYAL SOCIETY OF TASMANIA.

Oriental Christian Spectator for September.—BY THE EDITOR.

Proceedings of the Royal Geological Society of London, Vol. V. No. 4.—BY THE SOCIETY.

Proceedings of the Royal Society of London, Vol. XI. No. 45.—BY THE SOCIETY.

Papers regarding culturable waste lands at the disposal of Government.—BY THE BENGAL GOVT.

Quarterly Journal of the Geological Society of London, Vol. 18, No. 67. BY THE SOCIETY.

Cultivation of Quina Tree in Java in 1859.—BY THE MADRAS GOVT.

Selections from the Records of the Bombay Government, No. 63, new series.—BY THE BOMBAY GOVT.

Selections from the Records of the Government of India, Foreign Department, No. 34.—BY THE GOVT. OF INDIA.

Selections from the Records of the Madras Government, Nos. 68 and 69.—BY THE SAME.

Bhāmini Bilāsa, Part I.—BY MR. E. B. COWELL.

*Exchanged.*

The Athenæum for August.

The Philosophical Magazine for September.

*Purchased.*

The Annals and Magazine of Natural History, Vol. VIII. No. 45, for September.

Analectes sur L'Histoire et La Littérature des Arabes D'Espagne by Al-Makkari, Vols. 1 and 2.

Annales des Sciences Naturelles, Vol. XIV. No. 3.

Abdul Razzák's Rokáyeat Jámi. رقعات جامی مولفہ عبدالرزاق

Brockhaus' Die Lieder des Hafis, Vol. 3, Part 3.

Benfey's Orient und Occident, Vol. I. Part 3.

Bohtlingk and Roth's Sanscrit Wörterbüch, 1851-60.

Franck's Etudes Orientales.

Juynboll's Abu'l Mahasin, Vol. 2, Part 2.

Reeve's Conchologia Iconica, Parts 210 and 211.

Revue des Deux Mondes for 15th August and 1st September.

Comptes Rendus, Vol. LIII. Nos. 5 to 8.

The Literary Gazette, Nos. 164 to 168.

LALGOPAL DUTT.

### FOR DECEMBER, 1861.

The monthly General Meeting of the Asiatic Society of Bengal was held on the 4th instant.

A. Grote, Esq., President, in the chair.

The proceedings of the last meeting were read and confirmed.

Presentations were received—

1. From Mr. W. Theobald, Junior, a box containing specimens of a Lagomys, a Lemming and some lizards.

2. From Captain W. A. Ross, a specimen of the Albatross.

3. From the same, a copy of Colonel Sleeman's Report on Budhuk *alias* Bagree Dacoits.

4. From Dr. H. Cleghorn, a copy of his paper on the subject of an expedition undertaken by him to the higher ranges of the Anamalia Hills, Coimbatore, in 1858, being an extract from the transactions of the Royal Society of Edinburgh, Vol. XXII. Part II.

5. From Major R. C. Tytler, a pamphlet entitled,—*Description D'Oiseaux Nouveaux de la Nouvelle Calédonie, par M. M. J. Verreaux et O'Des Murs*, being an extract from the *Revue et Magasin De Zoologie*, for September, 1860.

6. From the Bengal Government, a copy of the selections from the records of the Bengal Government, No. 38.

7. From the Ven'ble J. H. Pratt, a copy of each of his treatises on the Figure of the earth and “Scripture and Science not at variance.”

8. From Lieut.-Col. A. Fytche, Commissioner of Martaban and Tenasserim Provinces, a skeleton of an adult male of one of the aborigines of the Andaman Islands.

With reference to this presentation, the following letter has been received :—

*Maulmain, 1st November, 1861.*

SIR,—I have the pleasure to present to the Asiatic Society a skeleton of an adult male of one of the aborigines of the Andaman Group of Islands, one of the three who were lately captured in the vicinity of Port Blair, and who died at Maulmain a short time ago.

In my note on these people, forwarded to the Society in the latter end of May last, I stated my belief that their reputed similarity to the true African Negro had been much exaggerated, giving my reasons for such at length, and what I considered to be their origin. The Society will no doubt be able to determine distinctly from the bones now sent, whether these people are true aborigines or belonging to the African Negro race as formerly represented.

I remain, dear Sir,

Yours sincerely,

(Sd.) A. FYTCHE, LIEUT.-COL.

Letters from Messrs. W. S. Halsey and A. Payne expressing their desire to withdraw from the Society were recorded.

The following gentlemen, duly proposed at the last meeting, were balloted for and elected ordinary members :—

Major H. R. James, C. B.

M. Kempson, Esq.

C. B. Saunders, Esq., C. S.

Captain W. A. Ross, Bengal Artillery.

The following gentlemen were named for ballot at the next meeting :—

Major D. Briggs (for re-election) proposed by the President, seconded by Colonel Yule.

G. E. Ward, Esq., C. S, proposed by Mr. Cowell, seconded by the President.

W. King, Esq., Junior, Geological Survey of India, proposed by Mr. T. Oldham, seconded by Mr. J. G. Medlicott.

Communications were received—

1. From Babu Radha Nath Sikdar, Abstracts of Meteorological Observations taken at the Surveyor General's Office, in June last.

2. From Mr. F. E. Hall, a paper on the vestiges of three Royal lines of Kanouj.

The President informed the meeting of the appointment by Government of Colonel A. Cunningham on an Archæological Mission which might be expected to occupy him for the next two years and in the course of which the Colonel intended to explore the interesting district of Behar. He invited Mr. Bayley to read extracts from a letter in which Colonel Cunningham sketched his plans for the ensuing cold weather.

Mr. Bayley stated that from a private letter he understood it to be Colonel Cunningham's intentions to devote the present cold season to the examination of Behar and especially to the exploration of the sites of the ancient cities of Vaisali and Kusinagara and of some unopened *topes* in their vicinity. Mr. Bayley added that Colonel Cunningham's letter also announced his acquisition of an extremely curious silver coin of the Indo-Parthian group. Mr. Bayley concluded by expressing his views regarding this class of coins and the relation of the kings by whom they were struck to the Bactrian and Indo-Seythian Kings of Upper India.

The Officiating Librarian submitted the usual monthly report.

#### LIBRARY.

The following books and periodicals were added since the November meeting.

#### *Presented.*

The Vividhartha Sangraha, No. 76.—BY THE EDITOR.

The Calcutta Christian Observer for November.—BY THE EDITOR.



Prison Return of the N. W. Provinces for 1860.—BY THE GOVT. N. W. PROVINCES.

Expedition to the Higher Ranges of the Anamalia Hills, Coimbatore, in 1858. By Dr. H. Cleghorn.—BY THE AUTHOR.

Description D'Oiseaux Nouveaux de la Nouvelle Caledonie, par M. M. J. Verreaux et O'Des Murs.—BY MAJOR R. C. TYTLER.

Journal Asiatique, Tome XVIII. No. 69.—BY THE ASIATIC SOCIETY OF PARIS.

Journal of the Royal Asiatic Society of London, Vol. XIX. Part I.—BY THE SOCIETY.

Journal of Sacred Literature and Biblical Record, Vol. XIV. No. 27.—BY THE EDITORS.

Purána Sangraha, Parts 3 to 6.—BY BABU K. P. SINGH.

Memoirs of the Geological Survey of India, Palæontologia Indica, Vol. I., Part I. containing descriptions of the Cretaceous Cephalopoda of S. India, By Mr. H. F. Blanford.—BY THE GOVT. OF INDIA.

The Oriental Baptist for November.—BY THE EDITOR.

The Figure of the Earth. By Archdeacon Pratt.—BY THE AUTHOR.

Scripture and Science not at variance.—BY THE SAME.

Report on the Cholera in the Delhi Division, No. 8.—BY THE PUNJAB GOVERNMENT.

Report (fifth) of the Council of the International Association.—BY THE ASSOCIATION.

Report of the Oriental Translation Committee for 1861.—BY THE TRANSLATION COMMITTEE.

Selections from the Records of the Government N. W. Provinces, No. 34.—BY THE GOVT. N. W. P.

Selections from the Records of the Bengal Government, No. 38.—BY THE BENGAL GOVT.

Sleeman's Report on Budhuk *alias* Bagree Decoits.—BY CAPT. W. A. ROSS.

*Exchanged.*

The Athenæum for September.

The Philosophical Magazine for October.

*Purchased.*

The Annals and Magazine of Natural History for October, Vol. VIII. No. 46.

The American Journal of Sciences and Arts, Vol. XIX. No. 95, for September.

The Natural History Review for October.

Revue et Magasin de Zoologie, No. 8 of 1861.

Revue des Deux Mondes for 15th September and 1st October.

The Westminster Review for October.

Dr. Weber's Indische Studien, Vol. VI.

Comptes Rendus, Vol. LIII. Nos. 9 to 12.

The Literary Gazette, Nos. 169, 171 and 172.

Journal des Savants for August.

Über Chinesische und Tibetische Lautverhältnisse, von Richard Lepsius, *Berlin*, 1861.

Über die Arabischen Sprachlaute und Deren Umschrift, von Richard Lepsius, *Berlin*, 1861.

LALGOPAL DUTT.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May, 1860.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Feet.

Height of the Cistern of the Standard Barometer above the Sea level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | o                             | o                                             | o    | o     |
| 1     | 29.670                                          | 29.736                                    | 29.586  | 0.150   | 89.1                          | 98.6                                          | 82.3 | 16.3  |
| 2     | .619                                            | .702                                      | .506    | .196    | 88.7                          | 97.6                                          | 82.8 | 14.8  |
| 3     | .655                                            | .694                                      | .596    | .098    | 84.0                          | 95.6                                          | 72.9 | 22.7  |
| 4     | .694                                            | .807                                      | .633    | .174    | 82.4                          | 93.0                                          | 72.8 | 20.2  |
| 5     | .752                                            | .845                                      | .676    | .169    | 83.5                          | 90.1                                          | 78.4 | 11.7  |
| 6     | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 7     | .753                                            | .812                                      | .661    | .151    | 84.7                          | 95.0                                          | 74.8 | 20.2  |
| 8     | .719                                            | .786                                      | .612    | .174    | 84.2                          | 93.1                                          | 75.0 | 18.1  |
| 9     | .626                                            | .697                                      | .544    | .153    | 85.6                          | 95.3                                          | 76.4 | 18.9  |
| 10    | .624                                            | .683                                      | .540    | .143    | 87.9                          | 94.8                                          | 83.6 | 11.2  |
| 11    | .652                                            | .705                                      | .576    | .129    | 86.8                          | 97.0                                          | 77.4 | 19.6  |
| 12    | .665                                            | .738                                      | .580    | .158    | 86.6                          | 96.8                                          | 77.2 | 19.6  |
| 13    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 14    | .600                                            | .654                                      | .532    | .122    | 91.1                          | 102.8                                         | 82.4 | 20.4  |
| 15    | .625                                            | .715                                      | .560    | .155    | 93.0                          | 103.5                                         | 84.2 | 19.3  |
| 16    | .628                                            | .697                                      | .566    | .131    | 92.0                          | 104.0                                         | 84.0 | 20.0  |
| 17    | .636                                            | .691                                      | .574    | .117    | 90.3                          | 100.6                                         | 83.8 | 16.8  |
| 18    | .650                                            | .722                                      | .585    | .137    | 90.3                          | 100.1                                         | 84.2 | 15.9  |
| 19    | .672                                            | .755                                      | .621    | .134    | 90.3                          | 100.4                                         | 83.2 | 17.2  |
| 20    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 21    | .613                                            | .691                                      | .523    | .168    | 93.2                          | 105.8                                         | 84.2 | 21.6  |
| 22    | .561                                            | .627                                      | .477    | .150    | 93.2                          | 105.2                                         | 84.8 | 20.4  |
| 23    | .524                                            | .594                                      | .447    | .147    | 91.6                          | 102.8                                         | 85.0 | 17.8  |
| 24    | .529                                            | .579                                      | .452    | .127    | 90.3                          | 100.2                                         | 83.8 | 16.4  |
| 25    | .528                                            | .580                                      | .447    | .133    | 89.6                          | 98.6                                          | 84.0 | 14.6  |
| 26    | .507                                            | .557                                      | .434    | .123    | 89.8                          | 100.2                                         | 83.6 | 16.6  |
| 27    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 28    | .535                                            | .602                                      | .477    | .125    | 88.2                          | 100.8                                         | 80.0 | 20.8  |
| 29    | .517                                            | .583                                      | .443    | .140    | 88.6                          | 97.6                                          | 80.8 | 16.8  |
| 30    | .490                                            | .563                                      | .428    | .135    | 90.1                          | 97.4                                          | 84.8 | 12.6  |
| 31    | .507                                            | .590                                      | .417    | .173    | 89.8                          | 99.0                                          | 81.2 | 17.8  |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the twenty-four hourly observations made during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May, 1860.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Date. | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a cubic foot of air. | Additional Weight of Va-<br>pour required for com-<br>plete saturation. | Mean degree of Humi-<br>dity, complete satura-<br>tion being unity. |
|-------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|
| 1     | 81.8                            | 7.3                 | 78.1                | 11.0                         | .943                             | 10.00                                            | 4.12                                                                    | .71                                                                 |
| 2     | 81.3                            | 7.4                 | 77.6                | 11.1                         | .928                             | 9.85                                             | .11                                                                     | .71                                                                 |
| 3     | 76.5                            | 7.5                 | 72.7                | 11.3                         | .792                             | 8.49                                             | 3.68                                                                    | .70                                                                 |
| 4     | 76.8                            | 5.6                 | 74.0                | 8.4                          | .827                             | .90                                              | 2.71                                                                    | .77                                                                 |
| 5     | 78.2                            | 5.3                 | 75.5                | 8.0                          | .868                             | 9.31                                             | .69                                                                     | .78                                                                 |
| 6     | Sunday.                         |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 7     | 79.2                            | 5.5                 | 76.4                | 8.3                          | .893                             | .56                                              | .86                                                                     | .77                                                                 |
| 8     | 79.2                            | 5.0                 | 76.7                | 7.5                          | .902                             | .64                                              | .60                                                                     | .79                                                                 |
| 9     | 79.6                            | 6.0                 | 76.6                | 9.0                          | .899                             | .59                                              | 3.17                                                                    | .75                                                                 |
| 10    | 81.7                            | 6.2                 | 78.6                | 9.3                          | .958                             | 10.19                                            | .45                                                                     | .75                                                                 |
| 11    | 80.5                            | 6.3                 | 77.3                | 9.5                          | .919                             | 9.78                                             | .43                                                                     | .74                                                                 |
| 12    | 80.7                            | 5.9                 | 77.7                | 8.9                          | .931                             | .92                                              | .22                                                                     | .76                                                                 |
| 13    | Sunday.                         |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 14    | 83.4                            | 7.7                 | 79.5                | 11.6                         | .986                             | 10.40                                            | 4.57                                                                    | .70                                                                 |
| 15    | 81.1                            | 11.9                | 75.1                | 17.9                         | .857                             | 9.00                                             | 6.81                                                                    | .57                                                                 |
| 16    | 83.8                            | 8.2                 | 79.7                | 12.3                         | .992                             | 10.46                                            | 4.90                                                                    | .68                                                                 |
| 17    | 83.2                            | 7.1                 | 79.6                | 10.7                         | .989                             | .45                                              | .18                                                                     | .71                                                                 |
| 18    | 83.5                            | 6.8                 | 80.1                | 10.2                         | 1.005                            | .62                                              | .01                                                                     | .73                                                                 |
| 19    | 83.5                            | 6.8                 | 80.1                | 10.2                         | .005                             | .62                                              | .01                                                                     | .73                                                                 |
| 20    | Sunday.                         |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 21    | 82.9                            | 10.3                | 77.7                | 15.5                         | 0.931                            | 9.78                                             | 6.12                                                                    | .62                                                                 |
| 22    | 83.2                            | 10.0                | 78.2                | 15.0                         | .946                             | .94                                              | 5.96                                                                    | .63                                                                 |
| 23    | 83.5                            | 8.1                 | 79.4                | 12.2                         | .983                             | 10.37                                            | 4.82                                                                    | .68                                                                 |
| 24    | 83.0                            | 7.3                 | 79.3                | 11.0                         | .979                             | .36                                              | .27                                                                     | .71                                                                 |
| 25    | 82.1                            | 7.5                 | 78.3                | 11.3                         | .949                             | .05                                              | .28                                                                     | .70                                                                 |
| 26    | 81.3                            | 8.5                 | 77.0                | 12.8                         | .910                             | 9.63                                             | .79                                                                     | .67                                                                 |
| 27    | Sunday.                         |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 28    | 80.1                            | 8.1                 | 76.0                | 12.2                         | .882                             | .37                                              | .39                                                                     | .68                                                                 |
| 29    | 81.6                            | 7.0                 | 78.1                | 10.5                         | .943                             | 10.00                                            | 3.92                                                                    | .72                                                                 |
| 30    | 83.3                            | 6.8                 | 79.9                | 10.2                         | .998                             | .56                                              | .98                                                                     | .73                                                                 |
| 31    | 83.0                            | 6.8                 | 79.6                | 10.2                         | .989                             | .48                                              | .94                                                                     | .73                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>for each hour during<br>the month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Temperature<br>for each hour during<br>the month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|----------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                           | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | °                             | °                                                              | °    | °     |
| Mid-<br>night. | 29.617                                          | 29.776                                                       | 29.461  | 0.315   | 83.5                          | 87.6                                                           | 72.9 | 14.7  |
| 1              | .607                                            | .756                                                         | .461    | .295    | 83.0                          | 87.0                                                           | 72.8 | 14.2  |
| 2              | .590                                            | .736                                                         | .453    | .283    | 83.0                          | 86.8                                                           | 73.2 | 13.6  |
| 3              | .592                                            | .729                                                         | .449    | .280    | 82.6                          | 86.2                                                           | 73.2 | 13.0  |
| 4              | .602                                            | .738                                                         | .451    | .287    | 82.4                          | 86.0                                                           | 73.5 | 12.5  |
| 5              | .615                                            | .753                                                         | .473    | .280    | 82.3                          | 85.6                                                           | 74.2 | 11.4  |
| 6              | .630                                            | .763                                                         | .490    | .273    | 82.4                          | 86.0                                                           | 75.0 | 11.0  |
| 7              | .650                                            | .791                                                         | .533    | .258    | 83.6                          | 87.0                                                           | 76.8 | 10.2  |
| 8              | .668                                            | .831                                                         | .535    | .296    | 86.8                          | 90.6                                                           | 81.8 | 8.8   |
| 9              | .676                                            | .845                                                         | .546    | .299    | 89.5                          | 93.0                                                           | 85.0 | 8.0   |
| 10             | .674                                            | .835                                                         | .546    | .289    | 92.4                          | 95.8                                                           | 85.5 | 10.3  |
| 11             | .659                                            | .800                                                         | .531    | .269    | 94.6                          | 100.4                                                          | 81.6 | 18.8  |
| Noon.          | .646                                            | .792                                                         | .523    | .269    | 96.3                          | 102.6                                                          | 84.1 | 18.5  |
| 1              | .623                                            | .768                                                         | .495    | .273    | 97.8                          | 104.6                                                          | 85.7 | 18.9  |
| 2              | .596                                            | .745                                                         | .479    | .266    | 98.2                          | 105.1                                                          | 87.7 | 17.4  |
| 3              | .569                                            | .721                                                         | .460    | .261    | 98.3                          | 105.8                                                          | 90.0 | 15.8  |
| 4              | .547                                            | .703                                                         | .428    | .275    | 97.0                          | 104.8                                                          | 90.1 | 14.7  |
| 5              | .541                                            | .697                                                         | .417    | .280    | 95.0                          | 103.6                                                          | 89.8 | 13.8  |
| 6              | .555                                            | .756                                                         | .430    | .326    | 91.6                          | 100.6                                                          | 80.0 | 20.6  |
| 7              | .581                                            | .755                                                         | .464    | .291    | 87.9                          | 95.0                                                           | 75.0 | 20.0  |
| 8              | .599                                            | .758                                                         | .477    | .281    | 86.1                          | 92.2                                                           | 74.4 | 17.8  |
| 9              | .621                                            | .807                                                         | .498    | .309    | 84.5                          | 89.4                                                           | 74.3 | 15.1  |
| 10             | .625                                            | .778                                                         | .492    | .286    | 84.4                          | 88.6                                                           | 73.6 | 15.0  |
| 11             | .621                                            | .764                                                         | .452    | .312    | 83.9                          | 88.4                                                           | 72.9 | 15.5  |

The Mean Height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the observations made at the several hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Hour.          | Mean Wet Bulb<br>Thermometer. | Dry Bulb above Wet. | Computed Dew point. | Dry Bulb above Dew<br>point. | Mean Elastic force of<br>Vapour. | Mean Weight of Va-<br>pour in a Cubic foot<br>of Air. | Additional Weight of<br>vapour required for<br>complete saturation. | Mean degree of Hu-<br>midity, complete satu-<br>ration being unity. |
|----------------|-------------------------------|---------------------|---------------------|------------------------------|----------------------------------|-------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|
|                | o                             | o                   | o                   | o                            | Inches.                          | Troy grs.                                             | Troy grs.                                                           |                                                                     |
| Mid-<br>night. | 79.5                          | 4.0                 | 77.5                | 6.0                          | .925                             | 9.92                                                  | 2.08                                                                | 0.83                                                                |
| 1              | 79.2                          | 3.8                 | 77.3                | 5.7                          | .919                             | .86                                                   | 1.96                                                                | .83                                                                 |
| 2              | 79.4                          | 3.6                 | 77.6                | 5.4                          | .923                             | .97                                                   | .85                                                                 | .84                                                                 |
| 3              | 79.3                          | 3.3                 | 77.6                | 5.0                          | .928                             | .97                                                   | .71                                                                 | .83                                                                 |
| 4              | 79.2                          | 3.2                 | 77.6                | 4.8                          | .928                             | .97                                                   | .64                                                                 | .86                                                                 |
| 5              | 79.4                          | 2.9                 | 77.9                | 4.4                          | .937                             | 10.08                                                 | .50                                                                 | .87                                                                 |
| 6              | 79.5                          | 2.9                 | 78.0                | 4.4                          | .940                             | .11                                                   | .50                                                                 | .87                                                                 |
| 7              | 80.4                          | 3.2                 | 78.8                | 4.8                          | .964                             | .34                                                   | .69                                                                 | .86                                                                 |
| 8              | 81.9                          | 4.9                 | 79.4                | 7.4                          | .983                             | .47                                                   | 2.74                                                                | .79                                                                 |
| 9              | 82.8                          | 6.7                 | 79.4                | 10.1                         | .983                             | .41                                                   | 3.88                                                                | .73                                                                 |
| 10             | 83.4                          | 9.0                 | 78.9                | 13.5                         | .967                             | .18                                                   | 5.36                                                                | .66                                                                 |
| 11             | 83.7                          | 10.9                | 78.2                | 16.4                         | .946                             | 9.92                                                  | 6.63                                                                | .60                                                                 |
|                |                               |                     |                     |                              |                                  |                                                       |                                                                     |                                                                     |
| Noon.          | 83.9                          | 12.4                | 77.7                | 18.6                         | .931                             | .72                                                   | 7.66                                                                | .56                                                                 |
| 1              | 84.5                          | 13.3                | 77.8                | 20.0                         | .934                             | .72                                                   | 8.41                                                                | .54                                                                 |
| 2              | 84.7                          | 13.5                | 77.9                | 20.3                         | .937                             | .75                                                   | .58                                                                 | .53                                                                 |
| 3              | 84.8                          | 13.5                | 78.0                | 20.3                         | .940                             | .78                                                   | .61                                                                 | .53                                                                 |
| 4              | 84.6                          | 12.4                | 78.4                | 18.6                         | .952                             | .92                                                   | 7.80                                                                | .56                                                                 |
| 5              | 83.3                          | 11.7                | 77.4                | 17.6                         | .922                             | .65                                                   | .09                                                                 | .53                                                                 |
| 6              | 82.2                          | 9.4                 | 77.5                | 14.1                         | .925                             | .76                                                   | 5.42                                                                | .64                                                                 |
| 7              | 80.7                          | 7.2                 | 77.1                | 10.8                         | .913                             | .70                                                   | 3.94                                                                | .71                                                                 |
| 8              | 80.1                          | 6.0                 | 77.1                | 9.0                          | .913                             | .74                                                   | .21                                                                 | .75                                                                 |
| 9              | 79.3                          | 5.2                 | 76.7                | 7.8                          | .902                             | .64                                                   | 2.71                                                                | .78                                                                 |
| 10             | 78.9                          | 5.5                 | 76.1                | 8.3                          | .885                             | .48                                                   | .83                                                                 | .77                                                                 |
| 11             | 78.9                          | 5.0                 | 76.4                | 7.5                          | .893                             | .56                                                   | .57                                                                 | .79                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May, 1860.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                                                                         |
|-------|-----------------------|---------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
|       | o                     | Inches.                         |                                   |                                                                                                                                                    |
| 1     | 1380.                 | ..                              | S. & S. W.                        | Scatd. clouds till 8 A. M. cloudless afterwards.                                                                                                   |
| 2     | 137.0                 | ..                              | S.                                | Scatd. clouds till 1 P. M. cloudless till 7 P. M. cloudy afterwards.                                                                               |
| 3     | 135.0                 | 0.86                            | S. & S. W.                        | Cloudless till 9 A. M. Scatd. $\searrow$ & $\swarrow$ till 4 P. M. cloudy afterwards; also raining between 6 & 8 P. M.                             |
| 4     | 132.0                 | ..                              | S. & S. E.                        | Cloudless till 4 A. M. Scatd. clouds till 7 P. M. cloudy afterwards; also thunder and lightning, accompanied with little rain between 9 & 11 P. M. |
| 5     | 124.5                 | ..                              | S.                                | Scatd. clouds till 5 P. M. cloudless till 9 P. M. cloudy afterwards.                                                                               |
| 6     | <i>Sunday.</i>        |                                 |                                   |                                                                                                                                                    |
| 7     | 128.2                 | 0.94                            | S. & S. E.                        | Scatd. clouds till 4 P. M. cloudy afterwards; also raining between 6 & 8 P. M.                                                                     |
| 8     | 128.0                 | 0.09                            | S. & S. E.                        | Scatd. clouds till 6 P. M. cloudy afterwards; also thunder & lightning & a little rain between 7 & 9 P. M.                                         |
| 9     | 133.0                 | ..                              | S. & S. E.                        | Cloudless till 4 A. M. Scatd. $\searrow$ till 1 P. M. cloudless afterwards.                                                                        |
| 10    | 129.8                 | ..                              | S. E. & S.                        | Cloudy till 10 A. M. cloudless till 5 P. M. Scatd. clouds afterwards.                                                                              |
| 11    | 135.0                 | 0.32                            | S. & S. E.                        | Cloudy; also rain accompanied with thunder & lightning between 7 & 8 P. M.                                                                         |
| 12    | 137.0                 | ..                              | S. & S. E.                        | Cloudless till 3 A. M. Scatd. clouds till 7 P. M. cloudless afterwards.                                                                            |
| 13    | <i>Sunday.</i>        |                                 |                                   |                                                                                                                                                    |
| 14    | 140.0                 | ..                              | S. & S. W.                        | Cloudless.                                                                                                                                         |
| 15    | 143.9                 | ..                              | S. & S. W.                        | Cloudless.                                                                                                                                         |
| 16    | 144.0                 | ..                              | S. & N. E.                        | Cloudless.                                                                                                                                         |
| 17    | 139.0                 | ..                              | S.                                | Cloudless till 3 P. M. cloudy till 7 P. M. cloudless afterwards.                                                                                   |
| 18    | 141.0                 | ..                              | S.                                | Cloudless till 11 A. M. Scatd. $\searrow$ till 6 P. M. cloudless afterwards.                                                                       |
| 19    | 142.6                 | ..                              | S.                                | Cloudless.                                                                                                                                         |
| 20    | <i>Sunday.</i>        |                                 |                                   |                                                                                                                                                    |
| 21    | 144.8                 | ..                              | S.                                | Cloudless.                                                                                                                                         |
| 22    | 146.8                 | ..                              | S. & S. E.                        | Cloudless.                                                                                                                                         |
| 23    | 136.0                 | ..                              | S. & S. E.                        | Cloudless till 4 A. M. Scatd. $\searrow$ till 5 P. M. cloudy till 9 P. M. cloudless afterwards.                                                    |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May, 1860.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                                   |
|-------|-----------------------|---------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------|
| 24    | 135.0                 | ..                              | S. & S. E. & E.                   | Cloudless till 4 A. M. Scatd. clouds till 8 P. M. cloudless afterwards; also thunder & lightning at 5 P. M.  |
| 25    | 133.0                 | ..                              | S. & S. E.                        | Cloudless till 7 A. M. Scatd. ci afterwards; also lightning at 8 P. M.                                       |
| 26    | 134.5                 | ..                              | S. & S. E.                        | Cloudless till 7 A. M. Scatd. clouds afterwards; also slightly drizzling at 6 P. M.                          |
| 27    | <i>Sunday.</i>        |                                 |                                   |                                                                                                              |
| 28    | 136.4                 | ..                              | S. & N. E.                        | Cloudless till 4 A. M. Scatd. ci till 3 P. M. cloudy afterwards; also slightly drizzling between 8 & 9 P. M. |
| 29    | 132.0                 | ..                              | S. & S. E.                        | Scatd. clouds; also lightning at 7 P. M.                                                                     |
| 30    | 133.4                 | ..                              | S.                                | Cloudless till 4 A. M. Scatd. clouds afterwards.                                                             |
| 31    | 135.0                 | ..                              | S. E. & S.                        | Scatd. ci & ci; also slightly drizzling at 8 P. M.                                                           |

ci Cirri, ci Cirro strati, ci Cumuli, ci Cumulo strati, ci Nimbi, —i Strati, ci Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May, 1860.*

MONTHLY RESULTS.

|                                                                |    |    | Inches |
|----------------------------------------------------------------|----|----|--------|
| Mean height of the Barometer for the month,                    | .. | .. | 29.613 |
| Max. height of the Barometer, occurred at 9 A. M. on the 5th,  | .. | .. | 29.845 |
| Min. height of the Barometer, occurred at 5 P. M. on the 31st, | .. | .. | 29.417 |
| <i>Extreme Range</i> of the Barometer during the month,        | .. | .. | 0.428  |
| Mean of the Daily Max. Pressures,                              | .. | .. | 29.682 |
| Ditto ditto Min. ditto,                                        | .. | .. | 29.537 |
| <i>Mean daily range</i> of the Barometer during the month,     | .. | .. | 0.145  |

---

|                                                              |    |    | o     |
|--------------------------------------------------------------|----|----|-------|
| Mean Dry Bulb Thermometer for the month,                     | .. | .. | 88.7  |
| Max. Temperature occurred at 3 P. M. on the 21st,            | .. | .. | 105.8 |
| Min. Temperature occurred at 1 A. M. on the 4th,             | .. | .. | 72.8  |
| <i>Extreme range</i> of the Temperature during the month,    | .. | .. | 33.0  |
| Mean of the daily Max. Temperature,                          | .. | .. | 98.7  |
| Ditto ditto Min. ditto,                                      | .. | .. | 81.0  |
| <i>Mean daily range</i> of the Temperature during the month, | .. | .. | 17.7  |

---

|                                                            |    |    | o      |
|------------------------------------------------------------|----|----|--------|
| Mean Wet Bulb Thermometer for the month,                   | .. | .. | 81.4   |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, | .. | .. | 7.3    |
| Computed Mean Dew Point for the month,                     | .. | .. | 77.7   |
| Mean Dry Bulb Thermometer above computed Mean Dew Point,   | .. | .. | 11.0   |
|                                                            |    |    | Inches |
| Mean Elastic force of vapour for the month,                | .. | .. | 0.931  |

---

|                                                                         |    |    | Troy grains |
|-------------------------------------------------------------------------|----|----|-------------|
| Mean weight of Vapour for the month,                                    | .. | .. | 9.88        |
| Additional weight of Vapour required for complete saturation,           | .. | .. | 4.08        |
| Mean degree of humidity for the month, complete saturation being unity, | .. | .. | 0.71        |

---

|                                                   |    |    | Inches     |
|---------------------------------------------------|----|----|------------|
| Rained 8 days,—Max. fall of rain during 24 hours, | .. | .. | 0.94       |
| Total amount of rain during the month,            | .. | .. | 2.21       |
| Prevailing direction of the Wind,                 | .. | .. | S. & S. E. |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May, 1860.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind  
blew, together with the number of days on which at the same hour,  
when any particular wind was blowing, it rained.

| Hour.     | N.           | Rain on.<br>N. E. | Rain on.<br>E. | E. | Rain on.<br>S. E. | Rain on.<br>S. | Rain on.<br>S. W. | S. W. | Rain on.<br>W. | W. | Rain on.<br>N. W. | N. W. | Rain on.<br>Calm. | Rain on. | Missed. |
|-----------|--------------|-------------------|----------------|----|-------------------|----------------|-------------------|-------|----------------|----|-------------------|-------|-------------------|----------|---------|
|           | No. of days. |                   |                |    |                   |                |                   |       |                |    |                   |       |                   |          |         |
| Midnight. |              |                   |                |    |                   |                |                   |       |                |    |                   |       |                   |          |         |
| 1         |              |                   |                |    | 7                 | 19             |                   |       |                |    |                   |       |                   |          | 1       |
| 2         |              |                   |                |    | 7                 | 19             |                   |       |                |    |                   |       |                   |          | 1       |
| 3         |              |                   |                |    | 7                 | 18             |                   |       |                |    |                   |       |                   |          | 2       |
| 4         |              |                   |                |    | 8                 | 18             | 1                 |       |                |    |                   |       |                   |          |         |
| 5         |              |                   |                |    | 9                 | 14             | 1                 |       |                |    |                   |       |                   |          | 3       |
| 6         |              |                   |                | 1  | 8                 | 17             | 1                 |       |                |    |                   |       |                   |          |         |
| 7         |              | 1                 |                | 4  | 6                 | 15             | 1                 |       |                |    |                   |       |                   |          |         |
| 8         |              |                   |                | 4  | 5                 | 21             |                   |       |                |    |                   |       |                   |          |         |
| 9         |              |                   |                | 1  | 1                 | 25             |                   |       |                |    |                   |       |                   |          |         |
| 10        |              |                   |                |    | 1                 | 23             | 3                 |       |                |    |                   |       |                   |          |         |
| 11        | 1            |                   |                |    | 3                 | 18             | 3                 |       | 1              |    | 1                 |       |                   |          |         |
| Noon.     | 1            |                   |                |    | 1                 | 19             | 4                 |       | 2              |    | 1                 |       |                   |          |         |
| 1         | 1            | 2                 |                |    | 4                 | 13             | 5                 |       | 1              |    |                   |       |                   |          |         |
| 2         |              | 1                 |                |    | 6                 | 10             | 6                 |       | 1              |    | 3                 |       | 1                 |          |         |
| 3         | 2            | 2                 |                |    | 8                 | 11             | 2                 |       | 2              |    |                   |       |                   |          |         |
| 4         | 2            | 3                 |                |    | 4                 | 15             | 3                 |       |                |    |                   |       |                   |          |         |
| 5         | 3            | 1                 | 1              |    | 4                 | 15             | 2                 |       |                |    |                   |       |                   |          |         |
| 6         | 2            | 1                 | 3              |    | 5                 | 13             | 2                 | 1     |                |    | 1                 |       |                   |          | 1       |
| 7         |              |                   | 2              |    | 4                 | 18             | 1                 |       | 1              | 1  | 1                 |       |                   |          |         |
| 8         |              | 1                 | 2              |    | 5                 | 17             | 2                 | 1     |                |    | 1                 | 1     |                   |          |         |
| 9         |              | 1                 | 2              |    | 8                 | 12             | 1                 | 2     | 1              |    |                   |       | 1                 |          | 1       |
| 10        |              | 1                 | 4              |    | 7                 | 13             | 1                 | 1     |                |    |                   |       | 1                 |          |         |
| 11        |              | 1                 | 3              |    | 7                 | 14             | 1                 |       |                |    |                   |       | 1                 |          |         |



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June, 1860.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

feet.

Height of the Cistern of the Standard Barometer above the Sea level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | o                             | o                                             | o    | o     |
| 1     | 29.575                                          | 29.621                                    | 29.499  | 0.122   | 88.0                          | 99.2                                          | 79.2 | 20.0  |
| 2     | .615                                            | .681                                      | .550    | .131    | 88.8                          | 98.9                                          | 78.8 | 20.1  |
| 3     | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 4     | .610                                            | .677                                      | .523    | .154    | 88.2                          | 98.6                                          | 79.0 | 19.6  |
| 5     | .602                                            | .665                                      | .545    | .120    | 86.5                          | 95.6                                          | 82.0 | 13.6  |
| 6     | .637                                            | .691                                      | .586    | .105    | 84.3                          | 91.3                                          | 81.0 | 10.3  |
| 7     | .670                                            | .742                                      | .620    | .122    | 82.3                          | 87.4                                          | 79.2 | 8.2   |
| 8     | .627                                            | .673                                      | .575    | .098    | 82.2                          | 86.4                                          | 79.8 | 6.6   |
| 9     | .608                                            | .657                                      | .555    | .102    | 84.6                          | 92.3                                          | 78.5 | 13.8  |
| 10    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 11    | .597                                            | .643                                      | .521    | .122    | 86.1                          | 93.4                                          | 81.2 | 12.2  |
| 12    | .572                                            | .631                                      | .510    | .121    | 83.9                          | 91.0                                          | 80.4 | 10.6  |
| 13    | .507                                            | .554                                      | .446    | .108    | 81.4                          | 84.8                                          | 79.4 | 5.4   |
| 14    | .442                                            | .484                                      | .368    | .116    | 81.8                          | 85.5                                          | 79.2 | 6.3   |
| 15    | .386                                            | .448                                      | .319    | .129    | 83.4                          | 88.8                                          | 79.3 | 9.5   |
| 16    | .337                                            | .385                                      | .293    | .092    | 84.4                          | 91.5                                          | 80.2 | 11.3  |
| 17    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 18    | .454                                            | .513                                      | .402    | .111    | 89.4                          | 96.4                                          | 83.4 | 13.0  |
| 19    | .539                                            | .608                                      | .479    | .129    | 83.8                          | 94.5                                          | 77.0 | 17.5  |
| 20    | .615                                            | .663                                      | .560    | .103    | 82.7                          | 90.5                                          | 77.6 | 12.9  |
| 21    | .629                                            | .676                                      | .558    | .118    | 85.3                          | 91.0                                          | 80.6 | 10.4  |
| 22    | .624                                            | .674                                      | .574    | .100    | 84.4                          | 89.0                                          | 81.2 | 7.8   |
| 23    | .594                                            | .645                                      | .534    | .111    | 86.1                          | 92.6                                          | 81.3 | 11.3  |
| 24    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 25    | .480                                            | .574                                      | .413    | .161    | 84.2                          | 87.4                                          | 78.2 | 9.2   |
| 26    | .423                                            | .458                                      | .380    | .078    | 85.1                          | 92.6                                          | 77.6 | 15.0  |
| 27    | .506                                            | .559                                      | .416    | .143    | 84.8                          | 90.6                                          | 80.6 | 10.0  |
| 28    | .529                                            | .597                                      | .469    | .128    | 86.1                          | 93.8                                          | 80.8 | 13.0  |
| 29    | .497                                            | .556                                      | .413    | .143    | 85.5                          | 92.0                                          | 80.8 | 11.2  |
| 30    | .478                                            | .549                                      | .436    | .113    | 84.1                          | 89.2                                          | 81.0 | 8.2   |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the twenty-four hourly observations made during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June, 1860.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Date. | Mean Wet Bulb Thermo-<br>meter. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a cubic foot of Air. | Additional Weight of Va-<br>pour required for com-<br>plete saturation. | Mean degree of Humidity,<br>complete saturation be-<br>ing unity. |
|-------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------|
|       | °                               | °                   | °                   | °                            | Inches.                          | T. gr.                                           | T. gr.                                                                  |                                                                   |
| 1     | 81.1                            | 6.9                 | 77.6                | 10.4                         | .0928                            | 9.87                                             | 3.81                                                                    | 0.72                                                              |
| 2     | 81.0                            | 7.8                 | 77.1                | 11.7                         | .913                             | .68                                              | 4.32                                                                    | .69                                                               |
| 3     | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 4     | 80.0                            | 8.2                 | 75.9                | 12.3                         | .879                             | .34                                              | .42                                                                     | .68                                                               |
| 5     | 80.3                            | 6.2                 | 77.2                | 9.3                          | .916                             | .77                                              | 3.33                                                                    | .75                                                               |
| 6     | 80.1                            | 4.2                 | 78.0                | 6.3                          | .940                             | 10.07                                            | 2.21                                                                    | .82                                                               |
| 7     | 79.4                            | 2.9                 | 77.9                | 4.4                          | .937                             | .08                                              | 1.50                                                                    | .87                                                               |
| 8     | 79.6                            | 2.6                 | 78.3                | 3.9                          | .949                             | .20                                              | .34                                                                     | .88                                                               |
| 9     | 80.1                            | 4.5                 | 77.8                | 6.8                          | .934                             | 9.99                                             | 2.40                                                                    | .81                                                               |
| 10    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 11    | 80.5                            | 5.6                 | 77.7                | 8.4                          | .931                             | .94                                              | 3.01                                                                    | .77                                                               |
| 12    | 80.0                            | 3.9                 | 78.0                | 5.9                          | .940                             | 10.07                                            | 2.06                                                                    | .83                                                               |
| 13    | 79.2                            | 2.2                 | 78.1                | 3.3                          | .943                             | .16                                              | 1.11                                                                    | .90                                                               |
| 14    | 79.3                            | 2.5                 | 78.0                | 3.8                          | .940                             | .11                                              | .29                                                                     | .89                                                               |
| 15    | 80.2                            | 3.2                 | 78.6                | 4.8                          | .958                             | .28                                              | .68                                                                     | .86                                                               |
| 16    | 80.6                            | 3.8                 | 78.7                | 5.7                          | .961                             | .29                                              | 2.02                                                                    | .84                                                               |
| 17    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 18    | 82.7                            | 6.7                 | 79.3                | 10.1                         | .979                             | .38                                              | 3.87                                                                    | .73                                                               |
| 19    | 80.5                            | 3.3                 | 78.8                | 5.0                          | .964                             | .34                                              | 1.76                                                                    | .86                                                               |
| 20    | 79.6                            | 3.1                 | 78.0                | 4.7                          | .940                             | .09                                              | .63                                                                     | .86                                                               |
| 21    | 80.6                            | 4.7                 | 78.2                | 7.1                          | .946                             | .11                                              | 2.53                                                                    | .80                                                               |
| 22    | 80.6                            | 3.8                 | 78.7                | 5.7                          | .961                             | .29                                              | .02                                                                     | .84                                                               |
| 23    | 81.6                            | 4.5                 | 79.3                | 6.8                          | .979                             | .44                                              | .51                                                                     | .81                                                               |
| 24    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 25    | 81.4                            | 2.8                 | 80.0                | 4.2                          | 1.001                            | .72                                              | 1.52                                                                    | .88                                                               |
| 26    | 81.0                            | 4.1                 | 78.9                | 6.2                          | 0.967                            | .34                                              | 2.23                                                                    | .82                                                               |
| 27    | 81.3                            | 3.5                 | 79.5                | 5.3                          | .986                             | .55                                              | 1.91                                                                    | .85                                                               |
| 28    | 81.5                            | 4.6                 | 79.2                | 6.9                          | .976                             | .41                                              | 2.54                                                                    | .80                                                               |
| 29    | 81.2                            | 4.3                 | 79.0                | 6.5                          | .970                             | .35                                              | .37                                                                     | .81                                                               |
| 30    | 80.8                            | 3.3                 | 79.1                | 5.0                          | .973                             | .42                                              | 1.79                                                                    | .85                                                               |

All the Hygrometrical elements are computed by the Greenwich constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer<br>at 32° Fabt. | Range of the Barometer for<br>each hour during the<br>month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture for each hour<br>during the<br>month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|---------------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                                | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | °                             | °                                                                   | °    | °     |
| Mid-<br>night. | 29.555                                          | 29.742                                                       | 29.369  | 0.373   | 81.8                          | 85.6                                                                | 77.7 | 7.9   |
| 1              | .541                                            | .712                                                         | .349    | .363    | 81.5                          | 85.4                                                                | 77.7 | 7.7   |
| 2              | .531                                            | .682                                                         | .310    | .372    | 81.2                          | 85.3                                                                | 77.6 | 7.7   |
| 3              | .530                                            | .628                                                         | .390    | .238    | 81.2                          | 85.2                                                                | 77.6 | 7.6   |
| 4              | .532                                            | .650                                                         | .301    | .349    | 80.8                          | 85.0                                                                | 78.0 | 7.0   |
| 5              | .537                                            | .647                                                         | .302    | .345    | 80.9                          | 84.2                                                                | 77.8 | 6.4   |
| 6              | .554                                            | .665                                                         | .317    | .348    | 81.1                          | 84.6                                                                | 78.0 | 6.6   |
| 7              | .569                                            | .679                                                         | .344    | .335    | 82.0                          | 85.6                                                                | 79.4 | 6.2   |
| 8              | .582                                            | .688                                                         | .356    | .332    | 84.5                          | 89.0                                                                | 79.6 | 9.4   |
| 9              | .587                                            | .692                                                         | .360    | .332    | 86.2                          | 90.8                                                                | 79.8 | 11.0  |
| 10             | .586                                            | .691                                                         | .363    | .328    | 88.2                          | 93.2                                                                | 81.4 | 11.8  |
| 11             | .579                                            | .684                                                         | .364    | .320    | 89.5                          | 96.4                                                                | 81.8 | 14.6  |
|                |                                                 |                                                              |         |         |                               |                                                                     |      |       |
| Noon.          | .564                                            | .690                                                         | .346    | .344    | 90.2                          | 99.0                                                                | 81.9 | 17.1  |
| 1              | .547                                            | .677                                                         | .325    | .352    | 89.8                          | 99.2                                                                | 81.4 | 17.8  |
| 2              | .526                                            | .647                                                         | .315    | .332    | 89.7                          | 99.0                                                                | 81.2 | 17.8  |
| 3              | .509                                            | .640                                                         | .297    | .343    | 89.4                          | 98.9                                                                | 77.0 | 21.9  |
| 4              | .490                                            | .634                                                         | .293    | .341    | 88.7                          | 97.8                                                                | 77.6 | 20.2  |
| 5              | .494                                            | .620                                                         | .300    | .320    | 87.8                          | 97.2                                                                | 77.7 | 19.5  |
| 6              | .501                                            | .629                                                         | .324    | .305    | 85.8                          | 94.0                                                                | 77.6 | 16.4  |
| 7              | .522                                            | .650                                                         | .332    | .318    | 84.4                          | 91.0                                                                | 78.0 | 13.0  |
| 8              | .538                                            | .658                                                         | .347    | .311    | 83.7                          | 90.0                                                                | 77.8 | 12.2  |
| 9              | .556                                            | .678                                                         | .367    | .311    | 83.3                          | 88.6                                                                | 77.8 | 10.8  |
| 10             | .569                                            | .687                                                         | .367    | .320    | 82.9                          | 87.8                                                                | 77.8 | 10.0  |
| 11             | .561                                            | .691                                                         | .374    | .317    | 82.3                          | 86.6                                                                | 78.4 | 8.2   |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Hour.          | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force<br>of Vapour. | Mean Weight of Va-<br>pour in a Cubic<br>foot of Air. | Additional Weight of<br>Vapour required<br>for complete satu-<br>ration. | Mean degree of Hu-<br>midity, complete<br>saturation being<br>unity. |
|----------------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------|
|                | o                               | o                   | o                   | o                            | Inches.                          | T. gr.                                                | T. gr.                                                                   |                                                                      |
| Mid-<br>night. | 79.0                            | 2.8                 | 77.6                | 4.2                          | 0.928                            | 9.99                                                  | 1.41                                                                     | 0.88                                                                 |
| 1              | 78.8                            | 2.7                 | 77.4                | 4.1                          | .922                             | .93                                                   | .38                                                                      | .88                                                                  |
| 2              | 78.8                            | 2.4                 | 77.6                | 3.6                          | .928                             | .99                                                   | .22                                                                      | .89                                                                  |
| 3              | 79.0                            | 2.2                 | 77.9                | 3.3                          | .937                             | 10.10                                                 | .11                                                                      | .90                                                                  |
| 4              | 78.6                            | 2.2                 | 77.5                | 3.3                          | .925                             | 9.98                                                  | .09                                                                      | .90                                                                  |
| 5              | 78.8                            | 2.1                 | 77.7                | 3.2                          | .931                             | 10.04                                                 | .06                                                                      | .91                                                                  |
| 6              | 79.0                            | 2.1                 | 77.9                | 3.2                          | .937                             | .10                                                   | .07                                                                      | .90                                                                  |
| 7              | 79.7                            | 2.3                 | 78.5                | 3.5                          | .955                             | .27                                                   | .20                                                                      | .90                                                                  |
| 8              | 80.9                            | 3.6                 | 79.1                | 5.4                          | .973                             | .42                                                   | .93                                                                      | .84                                                                  |
| 9              | 81.4                            | 4.8                 | 79.0                | 7.2                          | .970                             | .35                                                   | 2.64                                                                     | .80                                                                  |
| 10             | 82.1                            | 6.1                 | 79.0                | 9.2                          | .970                             | .31                                                   | 3.45                                                                     | .75                                                                  |
| 11             | 82.4                            | 7.1                 | 78.8                | 10.7                         | .964                             | .21                                                   | 4.08                                                                     | .71                                                                  |
| Noon.          | 82.6                            | 7.6                 | 78.8                | 11.4                         | .964                             | .21                                                   | .38                                                                      | .70                                                                  |
| 1              | 82.3                            | 7.5                 | 78.5                | 11.3                         | .955                             | .12                                                   | .30                                                                      | .70                                                                  |
| 2              | 82.4                            | 7.3                 | 78.7                | 11.0                         | .961                             | .18                                                   | .19                                                                      | .71                                                                  |
| 3              | 82.2                            | 7.2                 | 78.6                | 10.8                         | .958                             | .15                                                   | .10                                                                      | .71                                                                  |
| 4              | 82.0                            | 6.7                 | 78.6                | 10.1                         | .958                             | .17                                                   | 3.79                                                                     | .73                                                                  |
| 5              | 81.9                            | 5.9                 | 78.9                | 8.9                          | .967                             | .28                                                   | .32                                                                      | .76                                                                  |
| 6              | 81.2                            | 4.6                 | 78.9                | 6.9                          | .967                             | .32                                                   | 2.51                                                                     | .80                                                                  |
| 7              | 80.2                            | 4.2                 | 78.1                | 6.3                          | .943                             | .10                                                   | .21                                                                      | .82                                                                  |
| 8              | 80.1                            | 3.6                 | 78.3                | 5.4                          | .949                             | .18                                                   | 1.89                                                                     | .84                                                                  |
| 9              | 80.0                            | 3.3                 | 78.3                | 5.0                          | .949                             | .18                                                   | .75                                                                      | .85                                                                  |
| 10             | 79.9                            | 3.0                 | 78.4                | 4.5                          | .952                             | .21                                                   | .58                                                                      | .87                                                                  |
| 11             | 79.6                            | 2.7                 | 78.2                | 4.1                          | .946                             | .17                                                   | .41                                                                      | .88                                                                  |

All the Hygrometrical elements are computed by the Greenwich constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June, 1860.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                          |
|-------|-----------------------|---------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------|
|       | °                     | Inches.                         |                                   |                                                                                                     |
| 1     | 134.0                 | ..                              | S. & E. & S. E.                   | Scatd. clouds; also very slightly drizzling at 7 P. M.                                              |
| 2     | 137.9                 | ..                              | S. & S. W.                        | Cloudless till 3 A. M. cloudy till 11 A. M. Scatd. ∩ till 5 P. M. cloudless afterwards.             |
| 3     | <i>Sunday.</i>        |                                 |                                   |                                                                                                     |
| 4     | 133.0                 | ..                              | N. E.                             | Scatd. clouds till 4 A. M. cloudless till 10 A. M. Scatd. ∩ afterwards.                             |
| 5     | 127.0                 | ..                              | S.                                | Scatd. ∩ & ∪ till 1 P. M. cloudy afterwards; also very slightly drizzling at 5 P. M.                |
| 6     | ..                    | ..                              | E. & S. E.                        | Scatd. ∩ till 6 A. M. cloudy afterwards; also drizzling after intervals between 1 P. M. & midnight. |
| 7     | ..                    | 0.15                            | E.                                | Cloudy; also constantly drizzling between Noon & 6 P. M.                                            |
| 8     | ..                    | ..                              | E. & S.                           | Cloudy; also constantly drizzling.                                                                  |
| 9     | 124.0                 | 0.34                            | S. & E.                           | Scatd. ∩ & ∪ till 6 P. M. cloudless afterwards; also raining between 5 & 6 P. M.                    |
| 10    | <i>Sunday.</i>        |                                 |                                   |                                                                                                     |
| 11    | ..                    | 0.32                            | N. E. & S. E. & E.                | Scatd. ∩ till 6 A. M. cloudy afterwards; also raining between 6 & 7 P. M.                           |
| 12    | ..                    | ..                              | E. & S.                           | Cloudy; also drizzling at 1 & 5 & 6 P. M.                                                           |
| 13    | ..                    | 1.16                            | S. & S. W.                        | Cloudy; also constantly raining or drizzling.                                                       |
| 14    | ..                    | 0.28                            | S. W. & W.                        | Cloudy; also occasionally drizzling.                                                                |
| 15    | ..                    | 0.34                            | S. W. & calm.                     | Cloudy; also raining between Noon & 1 P. M. & drizzling between 8 & 11 P. M.                        |
| 16    | ..                    | 0.39                            | S. W. & S.                        | Cloudy; also drizzling at 11 A. M. & between 5 & 9 P. M.                                            |
| 17    | <i>Sunday.</i>        |                                 |                                   |                                                                                                     |
| 18    | 137.0                 | ..                              | S. W. & S.                        | Cloudy till 8 A. M. cloudless till 3 P. M. cloudy till 8 P. M. cloudless afterwards.                |
| 19    | 120.5                 | 1.18                            | S. & E. & S. E.                   | Cloudless till 3 A. M. cloudy afterwards; also raining between 2 & 6 P. M.                          |
| 20    | 112.0                 | 0.14                            | S. & S. E. & E.                   | Cloudless till 8 A. M. Scatd. ∩ till 1 P. M. cloudy afterwards; also raining at 2 P. M.             |
| 21    | 135.0                 | ..                              | S. E. & E. & S.                   | Cloudless till 10 A. M. Scatd. ∪ & ∩ till 7 P. M. cloudless afterwards.                             |

∩i Cirri, ∩i Cirro strati, ∪i Cumuli, ∩i Cumulo strati, ∩i Nimbi, —i Strati, ∩i Cirro cumuli.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June, 1860.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                              |
|-------|-----------------------|---------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------|
| 22    | o<br>..               | Inches.<br>..                   | S.                                | Cloudless till 7 A. M. cloudy till 2 P. M. Scatd. ☉ & ☾ afterwards; also drizzling between 9 & 10 A. M. |
| 23    | 132.0                 | ..                              | S.                                | Cloudless till 4 A. M. Scatd. ☾ & ☉ till 11 A. M. cloudy till 7 P. M. cloudless afterwards.             |
| 24    | <i>Sunday.</i>        | 1.32                            |                                   |                                                                                                         |
| 25    | ..                    | 0.21                            | S. & S. W.                        | Cloudy; also drizzling between midnight & 2 A. M.; also slightly raining at noon & at 11 P. M.          |
| 26    | 126.0                 | 0.46                            | S. & S. W.                        | Cloudy till 9 A. M. Scatd. ☾ afterwards; also raining between midnight & 2 A. M.                        |
| 27    | ..                    | ..                              | S. & E.                           | Cloudy; also drizzling between 3 & 7 A. M.                                                              |
| 28    | 127.0                 | ..                              | S. & N. E.                        | Scatd. clouds till 3 P. M. Scatd. ☾ afterwards.                                                         |
| 29    | 132.4                 | 0.10                            | N. E. & E.                        | Cloudy; also drizzling at noon & between 4 & 6 P. M.                                                    |
| 30    | 126.0                 | 0.07                            | S. & N.                           | Cloudy; also drizzling at 1 & 5 & 6 A. M. & also at Noon.                                               |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June, 1860.*

MONTHLY RESULTS.

|                                                               |    |    | Inches |
|---------------------------------------------------------------|----|----|--------|
| Mean height of the Barometer for the month,                   | .. | .. | 29.544 |
| Max. height of the Barometer occurred at Midnight on the 7th, | .. | .. | 29.742 |
| Min. height of the Barometer occurred at 4 P. M. on the 16th, | .. | .. | 29.293 |
| <i>Extreme range</i> of the Barometer during the month,       | .. | .. | 0.449  |
| Mean of the daily Max. Pressures,                             | .. | .. | 29.601 |
| Ditto ditto Min. ditto,                                       | .. | .. | 29.482 |
| <i>Mean daily range</i> of the Barometer during the month,    | .. | .. | 0.119  |

---

|                                                              |    |    | 0    |
|--------------------------------------------------------------|----|----|------|
| Mean Dry Bulb Thermometer for the month,                     | .. | .. | 84.9 |
| Max. Temperature occurred at 1 P. M. on the 1st,             | .. | .. | 99.2 |
| Min. Temperature occurred at 3 P. M. on the 19th,            | .. | .. | 77.0 |
| <i>Extreme range</i> of the Temperature during the month,    | .. | .. | 22.2 |
| Mean of the daily Max. Temperature,                          | .. | .. | 91.7 |
| Ditto ditto Min. ditto,                                      | .. | .. | 79.9 |
| <i>Mean daily range</i> of the Temperature during the month, | .. | .. | 11.8 |

---

|                                                            |    |    | 0      |
|------------------------------------------------------------|----|----|--------|
| Mean Wet Bulb Thermometer for the month,                   | .. | .. | 80.6   |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, | .. | .. | 4.3    |
| Computed Mean Dew-point for the month,                     | .. | .. | 78.4   |
| Mean Dry Bulb Thermometer above computed Mean Dew-point,   | .. | .. | 6.5    |
|                                                            |    |    | Inches |
| Mean Elastic force of Vapour for the month,                | .. | .. | 0.952  |

---

|                                                                         |    |    | Troy grains |
|-------------------------------------------------------------------------|----|----|-------------|
| Mean Weight of Vapour for the month,                                    | .. | .. | 10.17       |
| Additional Weight of Vapour required for complete saturation,           | .. | .. | 2.32        |
| Mean degree of humidity for the month, complete saturation being unity, | .. | .. | 0.81        |

---

|                                                    |    |    | Inches  |
|----------------------------------------------------|----|----|---------|
| Rained 21 days, Max. fall of rain during 24 hours, | .. | .. | 1.32    |
| Total amount of rain during the month,             | .. | .. | 6.46    |
| Prevailing direction of the Wind,                  | .. | .. | S. & E. |

*Abstract of the Results of the Hourly Meteorological Observations  
 taken at the Surveyor General's Office, Calcutta,  
 in the month of June, 1860.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind  
 blew, together with the number of days on which at the same hour, when  
 any particular wind was blowing, it rained.

| Hour.     | N.           | Rain on.<br>N. E. | Rain on.<br>E. | Rain on.<br>S. E. | Rain on.<br>S. | Rain on.<br>S. W. | Rain on.<br>W. | Rain on.<br>N. W. | Rain on.<br>Calm. | Rain on.<br>Missed. |
|-----------|--------------|-------------------|----------------|-------------------|----------------|-------------------|----------------|-------------------|-------------------|---------------------|
|           | No. of days. |                   |                |                   |                |                   |                |                   |                   |                     |
| Midnight. | 1            | 1                 | 6              | 1                 | 3              | 10                | 2              | 3                 |                   | 1                   |
| 1         | 1            | 1                 | 6              |                   | 3              | 10                | 2              | 2                 | 1                 | 3                   |
| 2         | 1            | 1                 | 6              |                   | 3              | 10                | 2              | 2                 | 1                 | 3                   |
| 3         | 2            | 2                 | 6              | 1                 | 1              | 9                 | 2              | 1                 | 1                 | 4                   |
| 4         | 2            | 2                 | 8              | 1                 | 1              | 10                | 2              | 1                 | 1                 | 1                   |
| 5         | 3            | 1                 | 6              | 1                 | 2              | 9                 | 1              | 2                 | 1                 |                     |
| 6         | 1            | 3                 | 7              | 1                 | 2              | 8                 | 1              | 4                 | 1                 |                     |
| 7         |              | 5                 | 5              | 2                 | 3              | 6                 | 1              | 6                 | 1                 |                     |
| 8         |              | 3                 | 8              |                   | 2              | 9                 | 2              | 4                 |                   |                     |
| 9         |              | 1                 | 10             |                   | 2              | 7                 | 1              | 6                 | 2                 |                     |
| 10        |              | 1                 | 9              |                   | 3              | 6                 | 1              | 6                 | 1                 |                     |
| 11        |              | 5                 | 5              |                   | 2              | 5                 |                | 9                 | 1                 |                     |
| Noon.     | 1            | 2                 | 4              | 1                 | 4              | 6                 | 1              | 6                 | 1                 |                     |
| 1         |              | 3                 | 3              | 2                 | 4              | 7                 | 2              | 8                 | 1                 |                     |
| 2         | 1            | 2                 | 5              | 2                 | 3              | 7                 | 2              | 7                 | 1                 |                     |
| 3         | 1            | 2                 | 4              | 1                 | 4              | 7                 | 1              | 6                 | 1                 |                     |
| 4         |              | 2                 | 3              | 1                 | 5              | 12                | 1              | 2                 | 1                 | 1                   |
| 5         |              | 2                 | 4              | 1                 | 2              | 15                | 5              | 2                 |                   | 1                   |
| 6         |              | 1                 | 5              | 3                 | 3              | 12                | 2              | 4                 | 1                 | 1                   |
| 7         |              | 1                 | 3              | 1                 | 2              | 14                | 1              | 3                 | 1                 | 1                   |
| 8         |              | 2                 | 3              |                   | 2              | 13                |                | 3                 | 1                 | 1                   |
| 9         |              | 2                 | 3              | 1                 | 2              | 13                |                | 3                 | 1                 | 1                   |
| 10        |              | 2                 | 3              |                   | 3              | 13                |                | 3                 |                   | 1                   |
| 11        |              | 2                 | 2              | 1                 | 3              | 11                | 1              | 3                 |                   | 2                   |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July, 1860.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Feet.

Height of the Cistern of the Standard Barometer above the Sea level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | o                             | o                                             | o    | o     |
| 1     | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 2     | .530                                            | 29.584                                    | 29.462  | 0.122   | 85.3                          | 91.4                                          | 81.0 | 10.4  |
| 3     | .521                                            | .558                                      | .457    | .101    | 85.5                          | 91.3                                          | 78.6 | 12.7  |
| 4     | .524                                            | .561                                      | .458    | .103    | 85.0                          | 89.6                                          | 82.2 | 7.4   |
| 5     | .539                                            | .586                                      | .488    | .098    | 85.3                          | 90.6                                          | 81.4 | 9.2   |
| 6     | .532                                            | .569                                      | .478    | .091    | 85.5                          | 90.6                                          | 82.5 | 8.1   |
| 7     | .500                                            | .537                                      | .434    | .103    | 85.3                          | 90.4                                          | 82.0 | 8.4   |
| 8     | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 9     | .526                                            | .561                                      | .482    | .079    | 85.7                          | 90.8                                          | 81.6 | 9.2   |
| 10    | .505                                            | .566                                      | .468    | .098    | 87.3                          | 93.8                                          | 82.8 | 11.0  |
| 11    | .446                                            | .494                                      | .373    | .121    | 88.8                          | 96.8                                          | 82.0 | 14.8  |
| 12    | .456                                            | .519                                      | .401    | .118    | 87.0                          | 96.4                                          | 83.4 | 13.0  |
| 13    | .511                                            | .575                                      | .458    | .117    | 87.0                          | 94.0                                          | 81.4 | 12.6  |
| 14    | .534                                            | .574                                      | .486    | .088    | 85.4                          | 89.8                                          | 82.0 | 7.8   |
| 15    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 16    | .561                                            | .622                                      | .515    | .107    | 82.6                          | 87.4                                          | 79.8 | 7.6   |
| 17    | .584                                            | .624                                      | .527    | .097    | 83.2                          | 88.8                                          | 80.0 | 8.8   |
| 18    | .599                                            | .644                                      | .537    | .107    | 83.7                          | 88.6                                          | 80.0 | 8.6   |
| 19    | .567                                            | .605                                      | .514    | .091    | 83.7                          | 87.2                                          | 80.7 | 6.5   |
| 20    | .578                                            | .619                                      | .502    | .117    | 83.0                          | 84.8                                          | 80.6 | 4.2   |
| 21    | .552                                            | .592                                      | .491    | .101    | 83.3                          | 87.8                                          | 80.6 | 7.2   |
| 22    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 23    | .579                                            | .637                                      | .536    | .101    | 79.4                          | 81.6                                          | 77.0 | 4.6   |
| 24    | .592                                            | .635                                      | .532    | .103    | 80.7                          | 87.2                                          | 77.8 | 9.4   |
| 25    | .532                                            | .573                                      | .476    | .097    | 80.7                          | 83.4                                          | 78.0 | 5.4   |
| 26    | .496                                            | .546                                      | .434    | .112    | 79.6                          | 80.6                                          | 77.9 | 2.7   |
| 27    | .508                                            | .561                                      | .460    | .101    | 81.6                          | 84.1                                          | 78.4 | 5.7   |
| 28    | .511                                            | .545                                      | .464    | .081    | 81.8                          | 87.2                                          | 77.6 | 9.6   |
| 29    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 30    | .512                                            | .574                                      | .451    | .123    | 82.3                          | 85.7                                          | 79.0 | 6.7   |
| 31    | .537                                            | .586                                      | .471    | .115    | 82.9                          | 89.0                                          | 79.2 | 9.8   |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the twenty-four hourly observations made during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July, 1860.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Date. | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a cubic foot of air. | Additional Weight of Va-<br>pour required for com-<br>plete saturation. | Mean degree of Humi-<br>dity, complete satura-<br>tion being unity. |
|-------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|
|       | o                               | o                   | o                   | o                            | Inches.                          | T. gr.                                           | T. gr.                                                                  |                                                                     |
| 1     | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 2     | 81.4                            | 3.9                 | 79.4                | 5.9                          | 0.983                            | 10.49                                            | 2.15                                                                    | 0.83                                                                |
| 3     | 81.4                            | 4.1                 | 79.3                | 6.2                          | .979                             | .46                                              | .26                                                                     | .82                                                                 |
| 4     | 81.8                            | 3.2                 | 80.2                | 4.8                          | 1.008                            | .77                                              | 1.76                                                                    | .86                                                                 |
| 5     | 82.1                            | 3.2                 | 80.5                | 4.8                          | .017                             | .87                                              | .77                                                                     | .86                                                                 |
| 6     | 81.8                            | 3.7                 | 79.9                | 5.6                          | 0.998                            | .65                                              | 2.07                                                                    | .84                                                                 |
| 7     | 81.7                            | 3.6                 | 79.9                | 5.4                          | .998                             | .67                                              | 1.97                                                                    | .84                                                                 |
| 8     | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 9     | 82.0                            | 3.7                 | 80.1                | 5.6                          | 1.005                            | .71                                              | 2.09                                                                    | .84                                                                 |
| 10    | 82.5                            | 4.8                 | 80.1                | 7.2                          | .005                             | .69                                              | .72                                                                     | .80                                                                 |
| 11    | 83.1                            | 5.7                 | 80.2                | 8.6                          | .008                             | .68                                              | 3.32                                                                    | .76                                                                 |
| 12    | 82.4                            | 4.6                 | 80.1                | 6.9                          | .005                             | .69                                              | 2.60                                                                    | .80                                                                 |
| 13    | 81.6                            | 5.4                 | 78.9                | 8.1                          | 0.967                            | .30                                              | .99                                                                     | .78                                                                 |
| 14    | 80.7                            | 4.7                 | 78.3                | 7.1                          | .949                             | .14                                              | .54                                                                     | .80                                                                 |
| 15    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 16    | 79.8                            | 2.8                 | 78.4                | 4.2                          | .952                             | .23                                              | 1.45                                                                    | .88                                                                 |
| 17    | 80.3                            | 2.9                 | 78.8                | 4.4                          | .964                             | .36                                              | .53                                                                     | .87                                                                 |
| 18    | 80.5                            | 3.2                 | 78.9                | 4.8                          | .967                             | .37                                              | .70                                                                     | .86                                                                 |
| 19    | 80.2                            | 3.5                 | 78.4                | 5.3                          | .952                             | .21                                              | .86                                                                     | .85                                                                 |
| 20    | 80.4                            | 2.6                 | 79.1                | 3.9                          | .973                             | .45                                              | .37                                                                     | .83                                                                 |
| 21    | 80.8                            | 2.5                 | 79.5                | 3.8                          | .986                             | .57                                              | .36                                                                     | .89                                                                 |
| 22    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 23    | 77.8                            | 1.6                 | 77.0                | 2.4                          | .910                             | 9.85                                             | 0.77                                                                    | .93                                                                 |
| 24    | 78.5                            | 2.2                 | 77.4                | 3.3                          | .922                             | .95                                              | 1.09                                                                    | .90                                                                 |
| 25    | 79.2                            | 1.5                 | 78.4                | 2.3                          | .952                             | 10.27                                            | 0.77                                                                    | .93                                                                 |
| 26    | 78.7                            | 0.9                 | 78.2                | 1.4                          | .946                             | .24                                              | .45                                                                     | .96                                                                 |
| 27    | 79.5                            | 2.1                 | 78.4                | 3.2                          | .952                             | .25                                              | 1.09                                                                    | .90                                                                 |
| 28    | 79.2                            | 2.6                 | 77.9                | 3.9                          | .937                             | .08                                              | .32                                                                     | .88                                                                 |
| 29    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 30    | 79.7                            | 2.6                 | 78.4                | 3.9                          | .952                             | .23                                              | .35                                                                     | .88                                                                 |
| 31    | 80.3                            | 2.6                 | 79.0                | 3.9                          | .970                             | .42                                              | .37                                                                     | .88                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>for each hour during<br>the month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Temperature<br>for each hour during<br>the month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|----------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                           | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | °                             | °                                                              | °    | °     |
| Mid-<br>night. | 29.549                                          | 29.630                                                       | 29.459  | 0.171   | 82.1                          | 86.0                                                           | 78.4 | 7.6   |
| 1              | .537                                            | .609                                                         | .447    | .162    | 81.7                          | 85.8                                                           | 77.3 | 8.5   |
| 2              | .530                                            | .605                                                         | .436    | .169    | 81.4                          | 85.4                                                           | 77.8 | 7.6   |
| 3              | .519                                            | .602                                                         | .420    | .182    | 81.2                          | 84.8                                                           | 77.6 | 7.2   |
| 4              | .518                                            | .597                                                         | .421    | .176    | 80.7                          | 84.6                                                           | 77.0 | 7.6   |
| 5              | .524                                            | .600                                                         | .431    | .169    | 80.7                          | 84.4                                                           | 77.6 | 6.8   |
| 6              | .537                                            | .608                                                         | .450    | .158    | 80.6                          | 84.2                                                           | 77.8 | 6.4   |
| 7              | .551                                            | .623                                                         | .469    | .154    | 81.3                          | 85.2                                                           | 78.2 | 7.0   |
| 8              | .564                                            | .644                                                         | .479    | .165    | 83.4                          | 87.8                                                           | 78.6 | 9.2   |
| 9              | .569                                            | .643                                                         | .490    | .153    | 84.6                          | 89.4                                                           | 78.0 | 11.4  |
| 10             | .568                                            | .631                                                         | .484    | .147    | 86.1                          | 91.6                                                           | 78.6 | 13.0  |
| 11             | .563                                            | .637                                                         | .477    | .160    | 87.0                          | 93.7                                                           | 79.6 | 14.1  |
| Noon.          | .547                                            | .616                                                         | .457    | .159    | 87.6                          | 95.0                                                           | 79.5 | 15.5  |
| 1              | .531                                            | .613                                                         | .437    | .176    | 87.6                          | 96.4                                                           | 79.6 | 16.8  |
| 2              | .508                                            | .588                                                         | .414    | .174    | 87.3                          | 96.8                                                           | 80.4 | 16.4  |
| 3              | .493                                            | .569                                                         | .401    | .168    | 86.7                          | 96.8                                                           | 80.4 | 16.4  |
| 4              | .479                                            | .547                                                         | .373    | .174    | 86.4                          | 96.8                                                           | 80.4 | 16.4  |
| 5              | .479                                            | .541                                                         | .376    | .165    | 85.9                          | 94.4                                                           | 80.6 | 13.8  |
| 6              | .490                                            | .552                                                         | .392    | .160    | 85.0                          | 92.2                                                           | 80.6 | 11.6  |
| 7              | .509                                            | .579                                                         | .398    | .181    | 84.1                          | 91.4                                                           | 78.8 | 12.6  |
| 8              | .529                                            | .597                                                         | .436    | .161    | 83.6                          | 88.8                                                           | 79.3 | 9.5   |
| 9              | .548                                            | .616                                                         | .458    | .158    | 83.0                          | 86.6                                                           | 79.6 | 7.0   |
| 10             | .558                                            | .637                                                         | .472    | .165    | 82.7                          | 86.4                                                           | 79.0 | 7.4   |
| 11             | .560                                            | .637                                                         | .469    | .168    | 82.4                          | 86.0                                                           | 78.8 | 7.2   |

The Mean Height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Hour.          | Mean Wet Bulb<br>Thermometer. | Dry Bulb above Wet. | Computed Dew point. | Dry Bulb above Dew<br>point. | Mean Elastic force of<br>Vapour. | Mean Weight of Va-<br>pour in a Cubic foot<br>of Air. | Additional Weight of<br>vapour required for<br>complete saturation. | Mean degree of Hu-<br>midity, complete satu-<br>ration being unity. |
|----------------|-------------------------------|---------------------|---------------------|------------------------------|----------------------------------|-------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|
|                | o                             | o                   | o                   | o                            | Inches.                          | Troy grs.                                             | Troy grs.                                                           |                                                                     |
| Mid-<br>night. | 80.0                          | 2.1                 | 78.9                | 3.2                          | 0.967                            | 10.41                                                 | 1.10                                                                | 0.90                                                                |
| 1              | 79.7                          | 2.0                 | 78.7                | 3.0                          | .961                             | .35                                                   | .02                                                                 | .91                                                                 |
| 2              | 79.5                          | 1.9                 | 78.5                | 2.9                          | .955                             | .29                                                   | 0.98                                                                | .91                                                                 |
| 3              | 79.3                          | 1.9                 | 78.3                | 2.9                          | .949                             | .22                                                   | .99                                                                 | .91                                                                 |
| 4              | 79.0                          | 1.7                 | 78.1                | 2.6                          | .943                             | .16                                                   | .88                                                                 | .92                                                                 |
| 5              | 79.0                          | 1.7                 | 78.1                | 2.6                          | .943                             | .16                                                   | .88                                                                 | .92                                                                 |
| 6              | 79.0                          | 1.6                 | 78.2                | 2.4                          | .946                             | .21                                                   | .80                                                                 | .93                                                                 |
| 7              | 79.6                          | 1.7                 | 78.7                | 2.6                          | .961                             | .35                                                   | .89                                                                 | .92                                                                 |
| 8              | 80.7                          | 2.7                 | 79.3                | 4.1                          | .979                             | .51                                                   | 1.45                                                                | .88                                                                 |
| 9              | 81.3                          | 3.3                 | 79.6                | 5.0                          | .989                             | .58                                                   | .81                                                                 | .85                                                                 |
| 10             | 81.9                          | 4.2                 | 79.8                | 6.3                          | .995                             | .62                                                   | 2.33                                                                | .82                                                                 |
| 11             | 82.3                          | 4.7                 | 79.9                | 7.1                          | .998                             | .63                                                   | .66                                                                 | .80                                                                 |
| Noon.          | 82.5                          | 5.1                 | 79.9                | 7.7                          | .998                             | .61                                                   | .91                                                                 | .79                                                                 |
| 1              | 82.4                          | 5.2                 | 79.8                | 7.8                          | .995                             | .58                                                   | .94                                                                 | .78                                                                 |
| 2              | 82.4                          | 4.9                 | 79.9                | 7.4                          | .998                             | .63                                                   | .78                                                                 | .79                                                                 |
| 3              | 81.7                          | 5.0                 | 79.2                | 7.5                          | .976                             | .39                                                   | .79                                                                 | .79                                                                 |
| 4              | 81.7                          | 4.7                 | 79.3                | 7.1                          | .979                             | .44                                                   | .62                                                                 | .80                                                                 |
| 5              | 81.5                          | 4.4                 | 79.3                | 6.6                          | .979                             | .44                                                   | .43                                                                 | .81                                                                 |
| 6              | 80.9                          | 4.1                 | 78.8                | 6.2                          | .964                             | .31                                                   | .22                                                                 | .82                                                                 |
| 7              | 80.7                          | 3.4                 | 79.0                | 5.1                          | .970                             | .40                                                   | 1.81                                                                | .85                                                                 |
| 8              | 80.5                          | 3.1                 | 78.9                | 4.7                          | .967                             | .37                                                   | .66                                                                 | .86                                                                 |
| 9              | 80.2                          | 2.8                 | 78.8                | 4.2                          | .964                             | .36                                                   | .46                                                                 | .88                                                                 |
| 10             | 80.2                          | 2.5                 | 78.9                | 3.8                          | .967                             | .39                                                   | .33                                                                 | .89                                                                 |
| 11             | 80.1                          | 2.3                 | 78.9                | 3.5                          | .967                             | .39                                                   | .22                                                                 | .90                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July, 1860.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                      |
|-------|-----------------------|---------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------|
|       | o                     | Inches.                         |                                   |                                                                                                 |
| 1     | <i>Sunday.</i>        | 0.80                            |                                   |                                                                                                 |
| 2     | 130.8                 |                                 | S. & S. E.                        | Cloudless till 6 A. M. Scatd. \i & \i afterwards; also drizzling at 1 & at 5 P. M.              |
| 3     | ..                    | 0.86                            | S.                                | Scatd. \i & \i till 6 P. M. cloudless afterwards; also raining at 4 A. M.                       |
| 4     | ..                    | 0.09                            | S. & S. E.                        | Cloudless till 4 A. M. cloudy afterwards; also constantly drizzling between 2 & 8 P. M.         |
| 5     | ..                    | 0.60                            | S.                                | Cloudy; also raining between 8 A. M. & 1 P. M.                                                  |
| 6     | 115.0                 | ..                              | S.                                | Cloudy; also slightly raining at 4 A. M.                                                        |
| 7     | ..                    | 1.38                            | S.                                | Scatd. \i till 5 A. M. cloudy afterwards; also raining after intervals between 1 & 10 P. M.     |
| 8     | <i>Sunday.</i>        |                                 |                                   |                                                                                                 |
| 9     | ..                    | ..                              | S. & S. W.                        | Cloudy.                                                                                         |
| 10    | 120.0                 | ..                              | S. & S. W.                        | Scatd. \i till 1 P. M. Scatd. clouds till 7 P. M. cloudless afterwards.                         |
| 11    | 135.0                 | ..                              | S. W. & S.                        | Scatd. \i & \i till 7 A. M. cloudless till 1 P. M. Scatd. \i till 7 P. M. cloudless afterwards. |
| 12    | 123.7                 | ..                              | S.                                | Cloudy.                                                                                         |
| 13    | 128.0                 | ..                              | S. E. & S.                        | Cloudless till 9 A. M. Scatd. \i & \i afterwards.                                               |
| 14    | ..                    | ..                              | S. E. & S. & E.                   | Cloudless till 4 A. M. cloudy till 7 P. M. cloudless afterwards.                                |
| 15    | <i>Sunday.</i>        | 1.60                            |                                   |                                                                                                 |
| 16    | ..                    | 0.22                            | S. & S. E.                        | Scatd. \i till 10 A. M. cloudy afterwards; also drizzling at Noon & 3 P. M.                     |
| 17    | ..                    | 0.42                            | S. & S. E.                        | Cloudy; also raining at Midnight & between 10 A. M. & 1 P. M.                                   |
| 18    | ..                    | 0.26                            | S. & S. E.                        | Cloudy; also raining at 1 A. M. & 10 & 11 A. M.                                                 |
| 19    | ..                    | ..                              | S. & S. W.                        | Cloudless till 7 A. M. Scatd. \i till 6 P. M. Scatd. \i & \i afterwards.                        |
| 20    | ..                    | ..                              | S. E.                             | Cloudy till 7 P. M. cloudless afterwards; also drizzling at 9 A. M.                             |
| 21    | ..                    | 0.15                            | S. & S. W. & S. E.                | Cloudless till 8 A. M. cloudy afterwards; also raining at 10 A. M.                              |
| 22    | <i>Sunday.</i>        | 1.86                            |                                   |                                                                                                 |
| 23    | ..                    | 1.85                            | S. & S. E.                        | Cloudy; also constantly raining before 1 P. M.                                                  |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July, 1860.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                            |
|-------|-----------------------|---------------------------------|-----------------------------------|-------------------------------------------------------|
| 24    | ..                    | 0.12                            | S. E. & S.                        | Cloudy ; also constantly raining.                     |
| 25    | ..                    | 2.84                            | S. E. & W. & S.                   | Cloudy ; also constantly raining.                     |
| 26    | ..                    | 2.02                            | S.                                | Cloudy, with rain the whole day.                      |
| 27    | ..                    | ..                              | S. & S. E.                        | Cloudy ; also drizzling at 6 A. M.                    |
| 28    | ..                    | 1.10                            | S. & S. E.                        | Cloudy ; also incessantly raining between 2 & 8 A. M. |
| 29    | <i>Sunday.</i>        | 0.28                            |                                   |                                                       |
| 30    |                       | 0.49                            | S. & S. E.                        | Cloudy ; also occasionally drizzling.                 |
| 31    | 117.0                 | 0.98                            | E. & S.                           | Cloudy ; also raining at 3 & 7 P. M.                  |

∩ i Cirri, ∪ i Cirro strati, ∩ i Cumuli, ∪ i Cumulo strati, ∪ i Nimbi, — i Strati, ∪ i Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July, 1860.*

MONTHLY RESULTS.

|                                                               |    |    | Inches |
|---------------------------------------------------------------|----|----|--------|
| Mean height of the Barometer for the month,                   | .. | .. | 29.532 |
| Max. height of the Barometer occurred at 8 A. M. on the 18th, | .. | .. | 29.614 |
| Min. height of the Barometer occurred at 4 P. M. on the 11th, | .. | .. | 29.373 |
| <i>Extreme range</i> of the Barometer during the month,       | .. | .. | 0.271  |
| Mean of the Daily Max. Pressures,                             | .. | .. | 29.579 |
| Ditto ditto Min. ditto,                                       | .. | .. | 29.475 |
| <i>Mean daily range</i> of the Barometer during the month,    | .. | .. | 0.104  |

|                                                              |    |    | o    |
|--------------------------------------------------------------|----|----|------|
| Mean Dry Bulb Thermometer for the month,                     | .. | .. | 83.9 |
| Max. Temperature occurred at 2 & 3 P. M. on the 11th,        | .. | .. | 96.8 |
| Min. Temperature occurred at 4 A. M. on the 23rd,            | .. | .. | 77.0 |
| <i>Extreme range</i> of the Temperature during the month,    | .. | .. | 19.8 |
| Mean of the daily Max. Temperature,                          | .. | .. | 88.8 |
| Ditto ditto Min. ditto,                                      | .. | .. | 80.3 |
| <i>Mean daily range</i> of the Temperature during the month, | .. | .. | 8.5  |
| Mean Wet bulb Thermometer for the month,                     | .. | .. | 80.7 |
| Mean Dry bulb Thermometer above mean Wet bulb Thermometer,   | .. | .. | 3.2  |
| Computed Mean-Dew point for the month,                       | .. | .. | 79.1 |
| Mean Dry bulb Thermometer above computed mean Dew-point,     | .. | .. | 4.8  |

|                                             |    |    | Inches |
|---------------------------------------------|----|----|--------|
| Mean Elastic force of Vapour for the month, | .. | .. | 0.973  |

|                                                                         |    |    | Troy grains |
|-------------------------------------------------------------------------|----|----|-------------|
| Mean Weight of Vapour for the month,                                    | .. | .. | 10.42       |
| Additional Weight of Vapour required for complete saturation,           | .. | .. | 1.71        |
| Mean degree of humidity for the month, complete saturation being unity, | .. | .. | 0.86        |

|                                                    |    |    | Inches     |
|----------------------------------------------------|----|----|------------|
| Rained 23 days, Max. fall of rain during 24 hours, | .. | .. | 2.84       |
| Total amount of rain during the month,             | .. | .. | 17.92      |
| Prevailing direction of the Wind,                  | .. | .. | S. & S. E. |



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July, 1860.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind  
blew, together with the number of days on which at the same hour,  
when any particular wind was blowing, it rained.

| Hour.     | N.           | Rain on.<br>N. E. | Rain on.<br>E. | Rain on.<br>S. E. | Rain on.<br>S. | Rain on.<br>S. W. | Rain on.<br>W. | Rain on.<br>N. W. | Rain on.<br>Calm. | Rain on. | Missed. |
|-----------|--------------|-------------------|----------------|-------------------|----------------|-------------------|----------------|-------------------|-------------------|----------|---------|
|           | No. of days. |                   |                |                   |                |                   |                |                   |                   |          |         |
| Midnight. |              |                   |                |                   |                |                   |                |                   |                   |          |         |
| 1         |              |                   |                | 8                 | 2              | 16                | 1              | 1                 |                   |          | 1       |
| 2         |              |                   | 1              | 9                 | 2              | 15                | 3              | 1                 |                   |          |         |
| 3         |              |                   | 2              | 9                 | 1              | 15                | 3              | 1                 |                   |          |         |
| 4         |              |                   | 2              | 8                 | 2              | 14                | 2              | 1                 |                   |          | 1       |
| 5         |              |                   | 2              | 1                 | 8              | 3                 | 2              | 2                 |                   |          | 2       |
| 6         |              | 1                 | 1              | 6                 | 2              | 14                | 1              | 2                 |                   |          | 3       |
| 7         |              | 1                 | 3              | 8                 | 2              | 14                | 2              | 2                 |                   |          |         |
| 8         |              |                   | 4              | 7                 | 2              | 13                | 1              | 2                 |                   |          |         |
| 9         |              |                   | 4              | 1                 | 4              | 16                | 1              | 1                 | 1                 | 1        |         |
| 10        |              |                   | 3              | 6                 | 1              | 12                | 2              | 4                 | 1                 | 1        |         |
| 11        |              |                   | 1              | 3                 | 3              | 15                | 4              | 6                 | 1                 | 1        |         |
|           |              |                   | 1              | 5                 |                | 15                | 5              | 3                 | 2                 | 1        |         |
| Noon.     |              | 1                 |                | 7                 |                | 13                | 4              | 3                 | 2                 | 1        |         |
| 1         |              | 1                 | 1              | 7                 | 1              | 11                | 4              | 5                 | 1                 | 1        |         |
| 2         | 1            |                   | 3              | 5                 |                | 11                | 2              | 6                 | 2                 |          |         |
| 3         |              |                   | 2              | 1                 | 6              | 2                 | 11             | 2                 | 6                 |          |         |
| 4         |              |                   | 2              | 1                 | 3              |                   | 15             | 1                 | 4                 |          |         |
| 5         |              |                   | 1              |                   | 3              |                   | 20             | 4                 | 1                 |          | 1       |
| 6         |              |                   | 1              |                   | 5              |                   | 19             | 3                 | 1                 |          |         |
| 7         |              |                   | 1              | 1                 | 7              | 1                 | 15             | 1                 | 3                 |          |         |
| 8         |              |                   |                |                   | 8              | 2                 | 17             | 2                 | 1                 |          |         |
| 9         |              |                   |                |                   | 7              | 1                 | 18             | 2                 | 1                 |          |         |
| 10        |              |                   |                |                   | 7              | 1                 | 17             | 3                 | 1                 |          | 1       |
| 11        |              |                   |                |                   | 7              | 1                 | 16             | 1                 | 1                 | 1        | 1       |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August, 1860.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Feet.

Height of the Cistern of the Standard Barometer above the Sea level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahit. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|--------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                  | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                          | Inches.                                   | Inches. | Inches. | o                             | o                                             | o    | o     |
| 1     | 29.536                                           | 29.571                                    | 29.479  | 0.092   | 82.6                          | 87.0                                          | 79.6 | 7.4   |
| 2     | .454                                             | .546                                      | .365    | .181    | 83.5                          | 88.2                                          | 80.8 | 7.4   |
| 3     | .403                                             | .455                                      | .363    | .092    | 81.6                          | 85.4                                          | 79.2 | 6.2   |
| 4     | .471                                             | .549                                      | .409    | .140    | 82.4                          | 85.8                                          | 79.2 | 6.6   |
| 5     | Sunday.                                          |                                           |         |         |                               |                                               |      |       |
| 6     | .539                                             | .583                                      | .483    | .100    | 84.1                          | 88.4                                          | 81.0 | 7.4   |
| 7     | .594                                             | .644                                      | .548    | .096    | 82.1                          | 85.7                                          | 79.8 | 5.9   |
| 8     | .621                                             | .661                                      | .573    | .088    | 81.6                          | 84.8                                          | 79.0 | 5.8   |
| 9     | .627                                             | .681                                      | .541    | .140    | 85.3                          | 92.0                                          | 79.4 | 12.6  |
| 10    | .603                                             | .678                                      | .524    | .154    | 87.2                          | 92.8                                          | 82.6 | 10.2  |
| 11    | .515                                             | .564                                      | .424    | .140    | 88.5                          | 95.6                                          | 84.2 | 11.4  |
| 12    | Sunday.                                          |                                           |         |         |                               |                                               |      |       |
| 13    | .514                                             | .573                                      | .470    | .103    | 83.5                          | 87.4                                          | 80.6 | 6.8   |
| 14    | .565                                             | .613                                      | .511    | .102    | 83.5                          | 88.0                                          | 80.6 | 7.4   |
| 15    | .587                                             | .645                                      | .526    | .119    | 83.9                          | 87.6                                          | 80.6 | 7.0   |
| 16    | .558                                             | .600                                      | .486    | .114    | 84.1                          | 88.8                                          | 81.2 | 7.6   |
| 17    | .575                                             | .630                                      | .530    | .100    | 81.5                          | 82.7                                          | 79.8 | 2.9   |
| 18    | .664                                             | .722                                      | .607    | .115    | 80.7                          | 83.5                                          | 78.8 | 4.7   |
| 19    | Sunday.                                          |                                           |         |         |                               |                                               |      |       |
| 20    | .701                                             | .748                                      | .653    | .095    | 82.7                          | 86.8                                          | 79.4 | 7.4   |
| 21    | .652                                             | .710                                      | .583    | .127    | 80.8                          | 82.6                                          | 78.7 | 3.9   |
| 22    | .635                                             | .678                                      | .591    | .087    | 82.4                          | 86.2                                          | 79.2 | 7.0   |
| 23    | .663                                             | .696                                      | .605    | .091    | 82.3                          | 88.6                                          | 79.2 | 9.4   |
| 24    | .675                                             | .745                                      | .617    | .128    | 83.2                          | 88.4                                          | 79.6 | 8.8   |
| 25    | .719                                             | .777                                      | .667    | .110    | 82.5                          | 85.1                                          | 80.0 | 5.1   |
| 26    | Sunday.                                          |                                           |         |         |                               |                                               |      |       |
| 27    | .751                                             | .826                                      | .702    | .124    | 82.6                          | 86.0                                          | 79.0 | 7.0   |
| 28    | .722                                             | .784                                      | .640    | .144    | 85.5                          | 92.6                                          | 81.0 | 11.6  |
| 29    | .669                                             | .734                                      | .585    | .149    | 86.4                          | 93.0                                          | 82.2 | 10.8  |
| 30    | .652                                             | .708                                      | .580    | .128    | 86.6                          | 91.8                                          | 82.8 | 9.0   |
| 31    | .683                                             | .748                                      | .615    | .133    | 86.3                          | 91.5                                          | 82.6 | 8.9   |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the twenty-four hourly observations made during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August, 1860.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Date. | Mean Wet Bulb Thermo-<br>meter. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a cubic foot of Air. | Additional Weight of Va-<br>pour required for com-<br>plete saturation. | Mean degree of Humidity,<br>complete saturation be-<br>ing unity. |
|-------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------|
|       | °                               | °                   | °                   | °                            | Inches.                          | T. gr.                                           | T. gr.                                                                  |                                                                   |
| 1     | 80.3                            | 2.3                 | 79.1                | 3.5                          | 0.973                            | 10.45                                            | 1.23                                                                    | 0.90                                                              |
| 2     | 80.9                            | 2.6                 | 79.6                | 3.9                          | .989                             | .60                                              | .40                                                                     | .88                                                               |
| 3     | 79.3                            | 2.3                 | 78.1                | 3.5                          | .943                             | .14                                              | .20                                                                     | .89                                                               |
| 4     | 79.8                            | 2.6                 | 78.5                | 3.9                          | .955                             | .27                                              | .34                                                                     | .89                                                               |
| 5     | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 6     | 80.0                            | 4.1                 | 77.9                | 6.2                          | .937                             | .04                                              | 2.17                                                                    | .82                                                               |
| 7     | 80.0                            | 2.0                 | 77.7                | 4.4                          | .931                             | .02                                              | 1.49                                                                    | .87                                                               |
| 8     | 79.2                            | 2.4                 | 78.0                | 3.6                          | .940                             | .11                                              | .23                                                                     | .89                                                               |
| 9     | 81.1                            | 4.2                 | 79.0                | 6.3                          | .970                             | .37                                              | 2.27                                                                    | .82                                                               |
| 10    | 82.3                            | 4.9                 | 79.8                | 7.4                          | .995                             | .60                                              | .77                                                                     | .79                                                               |
| 11    | 83.4                            | 5.1                 | 80.8                | 7.7                          | 1.027                            | .89                                              | .99                                                                     | .79                                                               |
| 12    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 13    | 80.5                            | 3.0                 | 79.0                | 4.5                          | 0.970                            | .40                                              | 1.60                                                                    | .87                                                               |
| 14    | 80.4                            | 3.1                 | 78.8                | 4.7                          | .964                             | .34                                              | .66                                                                     | .86                                                               |
| 15    | 80.9                            | 3.0                 | 79.4                | 4.5                          | .983                             | .51                                              | .62                                                                     | .87                                                               |
| 16    | 81.1                            | 3.0                 | 79.6                | 4.5                          | .989                             | .58                                              | .63                                                                     | .87                                                               |
| 17    | 80.0                            | 1.5                 | 79.2                | 2.3                          | .976                             | .52                                              | 0.79                                                                    | .93                                                               |
| 18    | 79.2                            | 1.5                 | 78.4                | 2.3                          | .952                             | .27                                              | .77                                                                     | .93                                                               |
| 19    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 20    | 80.4                            | 2.3                 | 79.2                | 3.5                          | .976                             | .48                                              | 1.24                                                                    | .89                                                               |
| 21    | 79.5                            | 1.3                 | 78.8                | 2.0                          | .964                             | .40                                              | 0.67                                                                    | .94                                                               |
| 22    | 78.7                            | 3.7                 | 76.8                | 5.6                          | .905                             | 9.71                                             | 1.90                                                                    | .84                                                               |
| 23    | 79.1                            | 3.2                 | 77.5                | 4.8                          | .925                             | .94                                              | .64                                                                     | .86                                                               |
| 24    | 80.0                            | 3.2                 | 78.4                | 4.8                          | .952                             | 10.21                                            | .68                                                                     | .86                                                               |
| 25    | 80.1                            | 2.4                 | 78.9                | 3.6                          | .967                             | .39                                              | .25                                                                     | .89                                                               |
| 26    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 27    | 80.8                            | 1.8                 | 79.9                | 2.7                          | .998                             | .72                                              | 0.96                                                                    | .92                                                               |
| 28    | 82.0                            | 3.5                 | 80.2                | 5.3                          | 1.008                            | .77                                              | 1.95                                                                    | .85                                                               |
| 29    | 81.9                            | 4.5                 | 79.6                | 6.8                          | 0.989                            | .54                                              | 2.52                                                                    | .81                                                               |
| 30    | 82.3                            | 4.3                 | 80.1                | 6.5                          | 1.005                            | .69                                              | .45                                                                     | .81                                                               |
| 31    | 82.1                            | 4.2                 | 80.0                | 6.3                          | .001                             | .68                                              | .34                                                                     | .82                                                               |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer for<br>each hour during the<br>month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture for each hour<br>during the<br>month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|---------------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                                | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | o                             | o                                                                   | o    | o     |
| Mid-<br>night. | 29.621                                          | 29.750                                                       | 29.407  | 0.343   | 81.0                          | 85.0                                                                | 79.6 | 5.4   |
| 1              | .606                                            | .750                                                         | .403    | .347    | 81.7                          | 84.8                                                                | 79.4 | 5.4   |
| 2              | .596                                            | .724                                                         | .398    | .326    | 81.4                          | 84.7                                                                | 79.2 | 5.5   |
| 3              | .589                                            | .724                                                         | .385    | .339    | 81.2                          | 84.6                                                                | 79.0 | 5.6   |
| 4              | .591                                            | .726                                                         | .378    | .348    | 80.7                          | 83.4                                                                | 78.7 | 4.7   |
| 5              | .592                                            | .741                                                         | .396    | .345    | 80.8                          | 84.2                                                                | 79.0 | 5.2   |
| 6              | .609                                            | .745                                                         | .397    | .348    | 80.6                          | 84.2                                                                | 78.8 | 5.4   |
| 7              | .625                                            | .763                                                         | .416    | .347    | 81.2                          | 84.8                                                                | 78.8 | 6.0   |
| 8              | .640                                            | .794                                                         | .423    | .371    | 82.6                          | 86.2                                                                | 79.0 | 7.2   |
| 9              | .651                                            | .816                                                         | .435    | .381    | 84.1                          | 88.2                                                                | 79.3 | 8.9   |
| 10             | .652                                            | .826                                                         | .430    | .396    | 85.2                          | 90.4                                                                | 79.2 | 11.2  |
| 11             | .645                                            | .816                                                         | .426    | .390    | 86.0                          | 92.2                                                                | 79.8 | 12.4  |
| Noon.          | .631                                            | .796                                                         | .410    | .386    | 86.3                          | 93.6                                                                | 80.6 | 13.0  |
| 1              | .610                                            | .778                                                         | .389    | .389    | 86.6                          | 94.4                                                                | 80.4 | 14.0  |
| 2              | .586                                            | .746                                                         | .377    | .369    | 87.2                          | 95.6                                                                | 79.6 | 16.0  |
| 3              | .565                                            | .724                                                         | .363    | .361    | 87.1                          | 94.0                                                                | 81.2 | 12.8  |
| 4              | .554                                            | .716                                                         | .369    | .347    | 86.7                          | 95.4                                                                | 80.2 | 15.2  |
| 5              | .549                                            | .702                                                         | .365    | .337    | 85.9                          | 94.2                                                                | 80.4 | 13.8  |
| 6              | .559                                            | .709                                                         | .372    | .337    | 84.7                          | 92.4                                                                | 79.7 | 12.7  |
| 7              | .576                                            | .718                                                         | .383    | .335    | 83.5                          | 88.0                                                                | 79.4 | 8.6   |
| 8              | .602                                            | .752                                                         | .405    | .347    | 82.9                          | 87.0                                                                | 79.2 | 7.8   |
| 9              | .621                                            | .767                                                         | .425    | .342    | 82.7                          | 86.8                                                                | 79.4 | 7.4   |
| 10             | .636                                            | .768                                                         | .434    | .334    | 82.2                          | 86.0                                                                | 79.2 | 6.8   |
| 11             | .626                                            | .767                                                         | .429    | .338    | 82.2                          | 85.6                                                                | 79.2 | 6.4   |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Hour.          | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force<br>of Vapour. | Mean Weight of Va-<br>pour in a Cubic<br>foot of Air. | Additional Weight of<br>Vapour required<br>for complete satu-<br>ration. | Mean degree of Hu-<br>midity, complete<br>saturation being<br>unity. |
|----------------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------|
|                | o                               | o                   | o                   | o                            | Inches.                          | Troy grs.                                             | Troy grs.                                                                |                                                                      |
| Mid-<br>night. | 80.0                            | 1.9                 | 79.0                | 2.9                          | 0.970                            | 10.44                                                 | 1.00                                                                     | 0.91                                                                 |
| 1              | 79.8                            | 1.9                 | 78.8                | 2.9                          | .964                             | .38                                                   | 0.99                                                                     | .91                                                                  |
| 2              | 79.6                            | 1.8                 | 78.7                | 2.7                          | .961                             | .35                                                   | .92                                                                      | .92                                                                  |
| 3              | 79.5                            | 1.7                 | 78.6                | 2.6                          | .958                             | .32                                                   | .89                                                                      | .92                                                                  |
| 4              | 79.2                            | 1.5                 | 78.4                | 2.3                          | .952                             | .27                                                   | .77                                                                      | .93                                                                  |
| 5              | 79.2                            | 1.6                 | 78.4                | 2.4                          | .952                             | .27                                                   | .80                                                                      | .93                                                                  |
| 6              | 79.1                            | 1.5                 | 78.3                | 2.3                          | .949                             | .24                                                   | .77                                                                      | .93                                                                  |
| 7              | 79.4                            | 1.8                 | 78.5                | 2.7                          | .955                             | .29                                                   | .92                                                                      | .92                                                                  |
| 8              | 80.0                            | 2.6                 | 78.7                | 3.9                          | .961                             | .33                                                   | 1.35                                                                     | .88                                                                  |
| 9              | 80.9                            | 3.2                 | 79.3                | 4.8                          | .979                             | .48                                                   | .73                                                                      | .86                                                                  |
| 10             | 81.2                            | 4.0                 | 79.2                | 6.0                          | .976                             | .43                                                   | 2.18                                                                     | .83                                                                  |
| 11             | 81.5                            | 4.5                 | 79.2                | 6.8                          | .976                             | .41                                                   | .50                                                                      | .81                                                                  |
|                |                                 |                     |                     |                              |                                  |                                                       |                                                                          |                                                                      |
| Noon.          | 81.6                            | 4.7                 | 79.2                | 7.1                          | .976                             | .41                                                   | .61                                                                      | .80                                                                  |
| 1              | 81.8                            | 4.8                 | 79.4                | 7.2                          | .983                             | .47                                                   | .67                                                                      | .80                                                                  |
| 2              | 82.1                            | 5.1                 | 79.5                | 7.7                          | .986                             | .49                                                   | .88                                                                      | .79                                                                  |
| 3              | 81.9                            | 5.2                 | 79.3                | 7.8                          | .979                             | .42                                                   | .91                                                                      | .78                                                                  |
| 4              | 81.7                            | 5.0                 | 79.2                | 7.5                          | .976                             | .39                                                   | .79                                                                      | .79                                                                  |
| 5              | 81.5                            | 4.4                 | 79.3                | 6.6                          | .979                             | .44                                                   | .43                                                                      | .81                                                                  |
| 6              | 81.2                            | 3.5                 | 79.4                | 5.3                          | .983                             | .51                                                   | 1.91                                                                     | .85                                                                  |
| 7              | 80.5                            | 3.0                 | 79.0                | 4.5                          | .970                             | .40                                                   | .60                                                                      | .87                                                                  |
| 8              | 80.2                            | 2.7                 | 78.8                | 4.1                          | .964                             | .36                                                   | .43                                                                      | .88                                                                  |
| 9              | 80.3                            | 2.4                 | 79.1                | 3.6                          | .973                             | .45                                                   | .27                                                                      | .89                                                                  |
| 10             | 80.1                            | 2.1                 | 79.0                | 3.2                          | .970                             | .44                                                   | .10                                                                      | .91                                                                  |
| 11             | 80.1                            | 2.1                 | 79.0                | 3.2                          | .970                             | .44                                                   | .10                                                                      | .91                                                                  |

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August, 1860.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                               |
|-------|-----------------------|---------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------|
|       | o                     | Inches                          |                                   |                                                                                                          |
| 1     | ...                   | 2.13                            | S. & E.                           | Cloudy and heavy rain in the morning.                                                                    |
| 2     | ...                   | ..                              | N. & E. & S.                      | Scatd. clouds with slight drizzling between 5 & 6 P. M.                                                  |
| 3     | ...                   | 0.35                            | N. E. & S. & E.                   | Scatd. clouds & occasionally drizzling.                                                                  |
| 4     | ...                   | 0.38                            | S. & E.                           | Cloudy with rain between 2 & 5 A. M.                                                                     |
| 5     | <i>Sunday.</i>        |                                 |                                   |                                                                                                          |
| 6     | 121.6                 | ..                              | N. E. & E.                        | Cloudy with slight drizzling at 11 A. M. & 7 P. M.                                                       |
| 7     | 112.0                 | 0.12                            | E. & S. E.                        | Cloudy & occasionally drizzling.                                                                         |
| 8     | ...                   | 0.29                            | E. & S.                           | Cloudy with occasional drizzling.                                                                        |
| 9     | 135.8                 | 0.05                            | S & S. E.                         | Scatd. \-i & \-i.                                                                                        |
| 10    | 129.5                 | ..                              | W. & S. W.                        | Scatd. clouds of various kinds till 6 P. M. cloudless afterwards.                                        |
| 11    | 139.0                 | 1.29                            | W. & E.                           | Cloudless till 5 A. M. Scatd. \-i & \-i till 6 P. M. cloudy afterwards; also raining between 7 & 9 P. M. |
| 12    | <i>Sunday.</i>        | 1.16                            |                                   |                                                                                                          |
| 13    | ...                   | 0.15                            | S. & E.                           | Cloudy; also drizzling at 2 & 7 & 8 P. M.                                                                |
| 14    | ...                   | 0.26                            | S. & S. E.                        | Scatd. clouds; also drizzling at 1 & 11 A. M.; also raining at 10 P. M.                                  |
| 15    | ...                   | ..                              | S. & S. E.                        | Cloudy till 7 P. M. cloudless afterwards; also drizzling at 1 & 2 & 10 A. M.                             |
| 16    | ...                   | 1.18                            | S. & S. E.                        | Cloudy; also drizzling between Midnight & 3 A. M.; also raining between 8 & 11 P. M.                     |
| 17    | ...                   | 1.09                            | S. & S. E.                        | Cloudy; also constantly raining between 3 A. M. & 3 P. M.                                                |
| 18    | ...                   | 0.43                            | S. & E.                           | Cloudy; also constantly raining.                                                                         |
| 19    | <i>Sunday.</i>        |                                 |                                   |                                                                                                          |
| 20    | ...                   | 1.12                            | S. & E.                           | Cloudy; also raining between 3 & 6 P. M.                                                                 |
| 21    | ...                   | 0.87                            | S. W. & S.                        | Cloudy; also constantly raining between 1 A. M. & 4 P. M.                                                |
| 22    | ...                   | 0.27                            | W. & S. & S. W.                   | Cloudy; also drizzling at 4 & 5 A. M. & at Noon.                                                         |
| 23    | ...                   | 0.93                            | S. & S. W.                        | Cloudless till 5 A. M. cloudy afterwards between 4 & 11 P. M.                                            |
| 24    | ...                   | ..                              | S. & S. W.                        | Cloudy; also drizzling at midnight; also constantly raining.                                             |
| 25    | ...                   | ..                              | N. W. & S. E.                     | Cloudy & drizzling occasionally.                                                                         |
| 26    | <i>Sunday.</i>        | 1.76                            |                                   |                                                                                                          |
| 27    | ..                    | 0.57                            | E. & S.                           | Cloudy; also constantly raining between 3 & 6 A. M.; also drizzling at 10 A. M.                          |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August, 1860.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                            |
|-------|-----------------------|---------------------------------|-----------------------------------|-----------------------------------------------------------------------|
|       |                       | Inches.                         |                                   |                                                                       |
| 28    | 135.8                 | ..                              | S. E. & S.                        | Scatd. $\searrow$ i & $\nearrow$ i till 7 P. M. cloudless afterwards. |
| 29    | 134.0                 | ..                              | S. & W.                           | Scatd. $\searrow$ i & $\nearrow$ i.                                   |
| 30    | 132.8                 | ..                              | S. & S. W.                        | Scatd. $\searrow$ i & $\searrow$ i.                                   |
| 31    | 140.4                 | 0.25                            | S. & S. E. & E.                   | Scatd. $\searrow$ i & $\nearrow$ i.                                   |

$\nearrow$ i Cirri,  $\searrow$ i Cirro strati,  $\nearrow$ i Cumuli,  $\searrow$ i Cumulo strati,  $\searrow$ i Nimbi,—i Strati,  $\searrow$ i Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August, 1860.*

MONTHLY RESULTS.

|                                                                 |    |    | Inches |
|-----------------------------------------------------------------|----|----|--------|
| Mean height of the Barometer for the month,                     | .. | .. | 29.605 |
| Max. height of the Barometer, occurred at 10 A. M. on the 27th, | .. | .. | 29.826 |
| Min. height of the Barometer, occurred at 3 P. M. on the 3rd,   | .. | .. | 29.363 |
| <i>Extreme range</i> of the Barometer during the month,         | .. | .. | 0.463  |
| Mean of the Daily Max. Pressures,                               | .. | .. | 29.662 |
| Ditto ditto Min. ditto,                                         | .. | .. | 29.544 |
| <i>Mean daily range</i> of the Barometer during the month,      | .. | .. | 0.118  |

---

|                                                              |    |    | °    |
|--------------------------------------------------------------|----|----|------|
| Mean Dry Bulb Thermometer for the month,                     | .. | .. | 83.6 |
| Max. Temperature occurred at 2 P. M. on the 11th,            | .. | .. | 95.6 |
| Min. Temperature occurred at 4 A. M. on the 21st,            | .. | .. | 78.7 |
| <i>Extreme range</i> of the Temperature during the month,    | .. | .. | 16.9 |
| Mean of the daily Max. Temperature,                          | .. | .. | 88.0 |
| Ditto ditto Min. ditto,                                      | .. | .. | 80.4 |
| <i>Mean daily range</i> of the Temperature during the month, | .. | .. | 7.6  |

---

|                                                            |    |    | °      |
|------------------------------------------------------------|----|----|--------|
| Mean Wet Bulb Thermometer for the month,                   | .. | .. | 80.5   |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, | .. | .. | 3.1    |
| Computed Mean Dew Point for the month,                     | .. | .. | 78.9   |
| Mean Dry Bulb Thermometer above computed Mean Dew-point,   | .. | .. | 4.7    |
|                                                            |    |    | Inches |
| Mean Elastic force of vapour for the month,                | .. | .. | 0.967  |

---

|                                                                         |    |    | Troy grains |
|-------------------------------------------------------------------------|----|----|-------------|
| Mean weight of Vapour for the month,                                    | .. | .. | 10.37       |
| Additional weight of Vapour required for complete saturation,           | .. | .. | 1.66        |
| Mean degree of humidity for the month, complete saturation being unity, | .. | .. | 0.86        |

---

|                                                    |    |    | Inches  |
|----------------------------------------------------|----|----|---------|
| Rained 25 days, Max. fall of rain during 24 hours, | .. | .. | 2.13    |
| Total amount of rain during the month,             | .. | .. | 14.65   |
| Prevailing direction of the Wind,                  | .. | .. | S. & E. |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August, 1860.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind  
blew, together with the number of days on which at the same hour,  
when any particular wind was blowing, it rained.

| Hour.     | N.           | Rain on.<br>N. E. | Rain on.<br>E. | Rain on.<br>S. E. | Rain on.<br>S. | Rain on.<br>S. W. | Rain on.<br>W. | Rain on.<br>N. W. | Rain on.<br>Calm. | Rain on.<br>Missed. |
|-----------|--------------|-------------------|----------------|-------------------|----------------|-------------------|----------------|-------------------|-------------------|---------------------|
|           | No. of days. |                   |                |                   |                |                   |                |                   |                   |                     |
| Midnight. |              | 1                 | 3              | 6                 | 1              | 11                | 2              | 1                 |                   | 2                   |
| 1         |              | 1                 | 5              | 1                 | 5              | 1                 | 11             | 2                 | 1                 | 1                   |
| 2         |              | 1                 | 5              | 2                 | 5              | 1                 | 12             | 3                 | 1                 | 1                   |
| 3         |              | 1                 | 5              | 3                 | 5              | 1                 | 10             | 2                 | 1                 | 1                   |
| 4         |              | 1                 | 5              | 3                 | 4              | 1                 | 9              | 2                 | 1                 | 1                   |
| 5         |              | 2                 | 5              | 2                 | 7              | 1                 | 8              | 3                 | 3                 | 1                   |
| 6         |              | 2                 | 7              | 1                 | 3              | 1                 | 8              | 6                 | 2                 | 1                   |
| 7         | 1            | 2                 | 7              | 3                 | 3              | 1                 | 6              | 7                 | 1                 | 1                   |
| 8         | 2            |                   | 8              | 1                 | 1              | 1                 | 8              | 5                 | 1                 | 1                   |
| 9         | 1            |                   | 7              | 1                 | 1              | 1                 | 8              | 6                 | 1                 | 1                   |
| 10        | 1            | 1                 | 6              | 3                 | 9              | 2                 | 4              | 1                 | 5                 | 1                   |
| 11        | 1            | 1                 | 4              | 2                 | 2              | 9                 | 3              | 4                 | 1                 | 1                   |
| Noon.     | 1            | 2                 | 1              | 1                 | 2              | 11                | 2              | 5                 | 2                 | 5                   |
| 1         | 1            | 1                 | 2              | 2                 | 2              | 1                 | 10             | 3                 | 6                 | 5                   |
| 2         | 1            | 1                 | 1              | 1                 | 3              | 2                 | 10             | 2                 | 5                 | 6                   |
| 3         | 1            | 1                 | 2              | 1                 | 1              | 13                | 2              | 4                 | 2                 | 4                   |
| 4         | 1            | 2                 | 1              | 1                 | 3              | 12                | 2              | 2                 | 1                 | 2                   |
| 5         |              | 1                 | 2              | 1                 | 2              | 14                | 2              | 4                 | 2                 | 2                   |
| 6         |              | 1                 | 3              | 2                 | 4              | 14                | 3              | 2                 | 3                 | 3                   |
| 7         |              | 1                 | 5              | 1                 | 2              | 15                | 2              | 2                 | 1                 | 2                   |
| 8         |              | 1                 | 5              | 3                 | 3              | 1                 | 15             | 4                 | 1                 | 2                   |
| 9         |              | 2                 | 4              | 1                 | 4              | 1                 | 14             | 1                 | 2                 | 1                   |
| 10        |              | 2                 | 2              | 1                 | 4              | 1                 | 15             | 2                 | 2                 | 1                   |
| 11        |              | 3                 | 1              | 4                 | 4              | 1                 | 14             | 1                 | 2                 | 1                   |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September, 1860.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Feet.

Height of the Cistern of the Standard Barometer above the Sea level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | °                             | °                                             | °    | °     |
| 1     | 29.687                                          | 29.737                                    | 29.611  | 0.126   | 84.2                          | 89.6                                          | 81.5 | 8.1   |
| 2     | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 3     | .686                                            | .740                                      | .640    | .100    | 84.0                          | 89.6                                          | 80.8 | 8.8   |
| 4     | .691                                            | .752                                      | .625    | .127    | 84.5                          | 89.4                                          | 80.8 | 8.6   |
| 5     | .712                                            | .762                                      | .666    | .096    | 83.5                          | 87.4                                          | 81.2 | 6.2   |
| 6     | .724                                            | .791                                      | .669    | .122    | 83.2                          | 88.6                                          | 81.2 | 7.4   |
| 7     | .660                                            | .724                                      | .574    | .150    | 83.9                          | 89.5                                          | 80.2 | 9.3   |
| 8     | .586                                            | .643                                      | .507    | .136    | 82.2                          | 86.0                                          | 79.4 | 6.6   |
| 9     | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 10    | .724                                            | .794                                      | .658    | .136    | 81.9                          | 83.8                                          | 81.0 | 2.8   |
| 11    | .706                                            | .774                                      | .621    | .153    | 83.6                          | 89.2                                          | 80.0 | 9.2   |
| 12    | .684                                            | .736                                      | .613    | .123    | 84.6                          | 91.0                                          | 81.0 | 10.0  |
| 13    | .710                                            | .767                                      | .660    | .107    | 84.5                          | 89.6                                          | 80.8 | 8.8   |
| 14    | .701                                            | .766                                      | .641    | .125    | 84.1                          | 89.0                                          | 80.4 | 8.6   |
| 15    | .627                                            | .683                                      | .567    | .116    | 83.2                          | 88.4                                          | 80.6 | 7.8   |
| 16    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 17    | .588                                            | .650                                      | .536    | .114    | 84.2                          | 89.1                                          | 81.4 | 7.7   |
| 18    | .563                                            | .610                                      | .504    | .106    | 83.1                          | 90.0                                          | 80.0 | 10.0  |
| 19    | .509                                            | .558                                      | .443    | .115    | 81.6                          | 85.6                                          | 79.4 | 6.2   |
| 20    | .505                                            | .608                                      | .417    | .191    | 80.6                          | 82.8                                          | 78.2 | 4.6   |
| 21    | .653                                            | .717                                      | .563    | .154    | 81.0                          | 86.2                                          | 77.2 | 9.0   |
| 22    | .694                                            | .745                                      | .635    | .110    | 85.0                          | 91.2                                          | 79.0 | 12.2  |
| 23    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 24    | .694                                            | .756                                      | .620    | .136    | 84.7                          | 89.2                                          | 82.4 | 6.8   |
| 25    | .718                                            | .787                                      | .635    | .152    | 84.9                          | 91.1                                          | 81.3 | 9.8   |
| 26    | .725                                            | .793                                      | .671    | .122    | 82.2                          | 88.4                                          | 80.4 | 8.0   |
| 27    | .714                                            | .772                                      | .653    | .119    | 82.5                          | 89.8                                          | 79.6 | 10.2  |
| 28    | .719                                            | .796                                      | .642    | .154    | 83.2                          | 88.2                                          | 79.8 | 8.4   |
| 29    | .703                                            | .777                                      | .630    | .147    | 84.2                          | 91.2                                          | 80.4 | 10.8  |
| 30    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the twenty-four hourly observations made during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September, 1860.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Date. | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a cubic foot of air. | Additional Weight of Va-<br>pour required for com-<br>plete saturation. | Mean degree of Humi-<br>dity, complete satura-<br>tion being unity. |
|-------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|
| 1     | 80.9                            | 3.3                 | 79.2                | 5.0                          | Inches.<br>0.976                 | T. gr.<br>10.45                                  | T. gr.<br>1.79                                                          | 0.85                                                                |
| 2     | Sunday.                         |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 3     | 81.1                            | 2.9                 | 79.6                | 4.4                          | .989                             | .60                                              | .57                                                                     | .87                                                                 |
| 4     | 80.8                            | 3.7                 | 78.9                | 5.6                          | .967                             | .34                                              | 2.01                                                                    | .84                                                                 |
| 5     | 80.7                            | 2.8                 | 79.3                | 4.2                          | .979                             | .51                                              | 1.49                                                                    | .88                                                                 |
| 6     | 80.9                            | 2.3                 | 79.7                | 3.5                          | .992                             | .63                                              | .26                                                                     | .89                                                                 |
| 7     | 80.6                            | 3.3                 | 78.9                | 5.0                          | .967                             | .37                                              | .76                                                                     | .86                                                                 |
| 8     | 79.6                            | 2.6                 | 78.3                | 3.9                          | .949                             | .20                                              | .34                                                                     | .88                                                                 |
| 9     | Sunday.                         |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 10    | 80.4                            | 1.5                 | 79.6                | 2.3                          | .989                             | .65                                              | 0.79                                                                    | .93                                                                 |
| 11    | 81.0                            | 2.6                 | 79.7                | 3.9                          | .992                             | .63                                              | 1.40                                                                    | .88                                                                 |
| 12    | 81.3                            | 3.3                 | 79.6                | 5.0                          | .989                             | .58                                              | .81                                                                     | .85                                                                 |
| 13    | 80.7                            | 3.8                 | 78.8                | 5.7                          | .964                             | .31                                              | 2.04                                                                    | .84                                                                 |
| 14    | 80.8                            | 3.3                 | 79.1                | 5.0                          | .973                             | .42                                              | 1.79                                                                    | .85                                                                 |
| 15    | 80.5                            | 2.7                 | 79.1                | 4.1                          | .973                             | .45                                              | .44                                                                     | .88                                                                 |
| 16    | Sunday.                         |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 17    | 81.2                            | 3.0                 | 79.7                | 4.5                          | .992                             | .61                                              | .63                                                                     | .87                                                                 |
| 18    | 80.4                            | 2.7                 | 79.0                | 4.1                          | .970                             | .42                                              | .44                                                                     | .88                                                                 |
| 19    | 79.5                            | 2.1                 | 78.4                | 3.2                          | .952                             | .25                                              | .09                                                                     | .90                                                                 |
| 20    | 78.8                            | 1.8                 | 77.9                | 2.7                          | .937                             | .10                                              | 0.91                                                                    | .92                                                                 |
| 21    | 77.9                            | 3.1                 | 76.3                | 4.7                          | .890                             | 9.59                                             | 1.55                                                                    | .86                                                                 |
| 22    | 80.9                            | 4.1                 | 78.8                | 6.2                          | .964                             | 10.31                                            | 2.22                                                                    | .82                                                                 |
| 23    | Sunday.                         |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 24    | 81.7                            | 3.0                 | 80.2                | 4.5                          | 1.008                            | .77                                              | 1.65                                                                    | .87                                                                 |
| 25    | 81.1                            | 3.8                 | 79.2                | 5.7                          | 0.976                            | .43                                              | 2.06                                                                    | .84                                                                 |
| 26    | 79.7                            | 2.5                 | 78.4                | 3.8                          | .952                             | .23                                              | 1.31                                                                    | .89                                                                 |
| 27    | 79.8                            | 2.7                 | 78.4                | 4.1                          | .952                             | .23                                              | .41                                                                     | .88                                                                 |
| 28    | 80.2                            | 3.0                 | 78.7                | 4.5                          | .961                             | .31                                              | .58                                                                     | .87                                                                 |
| 29    | 80.9                            | 3.3                 | 79.2                | 5.0                          | .976                             | .45                                              | .79                                                                     | .85                                                                 |
| 30    | Sunday.                         |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>for each hour during<br>the month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Temperature<br>for each hour during<br>the month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|----------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                           | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | o                             | o                                                              | o    | o     |
| Mid-<br>night. | 29.683                                          | 29.740                                                       | 29.543  | 0.197   | 81.7                          | 84.6                                                           | 78.0 | 6.6   |
| 1              | .666                                            | .724                                                         | .454    | .270    | 81.4                          | 84.2                                                           | 77.8 | 6.4   |
| 2              | .656                                            | .718                                                         | .442    | .276    | 81.2                          | 84.7                                                           | 77.4 | 7.3   |
| 3              | .648                                            | .715                                                         | .427    | .288    | 80.9                          | 84.4                                                           | 77.2 | 7.2   |
| 4              | .647                                            | .711                                                         | .417    | .294    | 80.7                          | 84.0                                                           | 77.2 | 6.8   |
| 5              | .653                                            | .724                                                         | .442    | .282    | 80.7                          | 83.8                                                           | 77.6 | 6.2   |
| 6              | .671                                            | .750                                                         | .444    | .306    | 80.6                          | 83.6                                                           | 77.2 | 6.4   |
| 7              | .690                                            | .764                                                         | .464    | .300    | 81.3                          | 84.2                                                           | 77.8 | 6.4   |
| 8              | .710                                            | .790                                                         | .513    | .277    | 83.1                          | 85.6                                                           | 79.8 | 5.8   |
| 9              | .722                                            | .794                                                         | .516    | .278    | 84.4                          | 87.2                                                           | 80.0 | 7.2   |
| 10             | .723                                            | .796                                                         | .523    | .273    | 85.5                          | 88.2                                                           | 81.0 | 7.2   |
| 11             | .712                                            | .780                                                         | .530    | .250    | 86.3                          | 89.6                                                           | 81.0 | 8.6   |
|                |                                                 |                                                              |         |         |                               |                                                                |      |       |
| Noon.          | .691                                            | .761                                                         | .513    | .248    | 86.9                          | 89.6                                                           | 81.8 | 7.8   |
| 1              | .664                                            | .743                                                         | .497    | .246    | 87.0                          | 91.0                                                           | 81.6 | 9.4   |
| 2              | .641                                            | .725                                                         | .467    | .258    | 86.9                          | 91.2                                                           | 81.2 | 10.0  |
| 3              | .619                                            | .720                                                         | .444    | .276    | 86.1                          | 91.2                                                           | 80.6 | 10.6  |
| 4              | .610                                            | .700                                                         | .450    | .250    | 85.5                          | 91.0                                                           | 80.0 | 11.0  |
| 5              | .613                                            | .705                                                         | .443    | .262    | 84.6                          | 89.8                                                           | 79.8 | 10.0  |
| 6              | .626                                            | .709                                                         | .450    | .259    | 83.6                          | 86.5                                                           | 79.6 | 6.9   |
| 7              | .644                                            | .728                                                         | .461    | .267    | 83.0                          | 86.4                                                           | 79.4 | 7.0   |
| 8              | .668                                            | .746                                                         | .488    | .258    | 82.6                          | 85.8                                                           | 79.6 | 6.2   |
| 9              | .685                                            | .746                                                         | .499    | .247    | 82.4                          | 85.0                                                           | 79.6 | 5.4   |
| 10             | .687                                            | .752                                                         | .521    | .231    | 82.0                          | 84.6                                                           | 78.8 | 5.8   |
| 11             | .683                                            | .761                                                         | .502    | .259    | 81.8                          | 84.2                                                           | 78.2 | 6.0   |

The Mean Height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Hour.          | Mean Wet Bulb<br>Thermometer. | Dry Bulb above Wet. | Computed Dew point. | Dry Bulb above Dew<br>point. | Mean Elastic force of<br>Vapour. | Mean Weight of Va-<br>pour in a Cubic foot<br>of Air. | Additional Weight of<br>vapour required for<br>complete saturation. | Mean degree of Hu-<br>midity, complete satu-<br>ration being unity. |
|----------------|-------------------------------|---------------------|---------------------|------------------------------|----------------------------------|-------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|
|                | o                             | o                   | o                   | o                            | Inches.                          | Troy grs.                                             | Troy grs.                                                           |                                                                     |
| Mid-<br>night. | 79.9                          | 1.8                 | 79.0                | 2.7                          | .970                             | 10.44                                                 | 0.93                                                                | 0.92                                                                |
| 1              | 79.8                          | 1.6                 | 79.0                | 2.4                          | .970                             | .46                                                   | .81                                                                 | .93                                                                 |
| 2              | 79.6                          | 1.6                 | 78.8                | 2.4                          | .964                             | .40                                                   | .81                                                                 | .93                                                                 |
| 3              | 79.5                          | 1.4                 | 78.8                | 2.1                          | .964                             | .40                                                   | .70                                                                 | .94                                                                 |
| 4              | 79.4                          | 1.3                 | 78.7                | 2.0                          | .961                             | .37                                                   | .67                                                                 | .94                                                                 |
| 5              | 79.4                          | 1.3                 | 78.7                | 2.0                          | .961                             | .37                                                   | .67                                                                 | .94                                                                 |
| 6              | 79.3                          | 1.3                 | 78.6                | 2.0                          | .958                             | .34                                                   | .67                                                                 | .94                                                                 |
| 7              | 79.8                          | 1.5                 | 79.0                | 2.3                          | .970                             | .46                                                   | .78                                                                 | .93                                                                 |
| 8              | 80.5                          | 2.6                 | 79.2                | 3.9                          | .976                             | .48                                                   | 1.38                                                                | .88                                                                 |
| 9              | 81.0                          | 3.4                 | 79.3                | 5.1                          | .979                             | .48                                                   | .83                                                                 | .85                                                                 |
| 10             | 81.3                          | 4.2                 | 79.2                | 6.3                          | .976                             | .43                                                   | 2.29                                                                | .82                                                                 |
| 11             | 81.4                          | 4.9                 | 78.9                | 7.4                          | .967                             | .32                                                   | .70                                                                 | .79                                                                 |
| Noon.          | 81.6                          | 5.3                 | 78.9                | 8.0                          | .967                             | .30                                                   | .95                                                                 | .78                                                                 |
| 1              | 81.5                          | 5.5                 | 78.7                | 8.3                          | .961                             | .24                                                   | 3.05                                                                | .77                                                                 |
| 2              | 81.6                          | 5.3                 | 78.9                | 8.0                          | .967                             | .30                                                   | 2.95                                                                | .78                                                                 |
| 3              | 81.2                          | 4.9                 | 78.7                | 7.4                          | .961                             | .26                                                   | .69                                                                 | .79                                                                 |
| 4              | 81.1                          | 4.4                 | 78.9                | 6.6                          | .967                             | .32                                                   | .40                                                                 | .81                                                                 |
| 5              | 80.9                          | 3.7                 | 79.0                | 5.6                          | .970                             | .37                                                   | .02                                                                 | .84                                                                 |
| 6              | 80.6                          | 3.0                 | 79.1                | 4.5                          | .973                             | .42                                                   | 1.61                                                                | .87                                                                 |
| 7              | 80.5                          | 2.5                 | 79.2                | 3.8                          | .976                             | .48                                                   | .34                                                                 | .89                                                                 |
| 8              | 80.3                          | 2.3                 | 79.1                | 3.5                          | .973                             | .45                                                   | .23                                                                 | .90                                                                 |
| 9              | 80.3                          | 2.1                 | 79.2                | 3.2                          | .976                             | .50                                                   | .11                                                                 | .90                                                                 |
| 10             | 80.2                          | 1.8                 | 79.3                | 2.7                          | .979                             | .53                                                   | 0.94                                                                | .92                                                                 |
| 11             | 80.0                          | 1.8                 | 79.1                | 2.7                          | .973                             | .47                                                   | .93                                                                 | .92                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September, 1860.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                                                 |
|-------|-----------------------|---------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------|
|       | 0                     | Inches.                         |                                   |                                                                                                                            |
| 1     |                       | ..                              | S. & E.                           | Scatd. \i & \i till 1 P. M. cloudy afterwards; also drizzling at 3 & 5 P. M.                                               |
| 2     | <i>Sunday.</i>        | 0.44                            |                                   |                                                                                                                            |
| 3     | 131.4                 | ..                              | S. & S. E.                        | Scatd. clouds; also drizzling at 1 P. M.                                                                                   |
| 4     | 127.0                 | ..                              | S. & S. E.                        | Scatd. \i & \i.                                                                                                            |
| 5     | ..                    | 0.12                            | S. E. & S.                        | Scatd. \i & \i till 6 P. M. cloudless afterwards.                                                                          |
| 6     | ..                    | 0.15                            | E. & S.                           | Scatd. \i & \i till 9 A. M. cloudy till 6 P. M. cloudless afterwards; also constantly drizzling between 10 A. M. & 5 P. M. |
| 7     | ..                    | ..                              | S.                                | Cloudless till 6 A. M. Scatd. clouds till 7 P. M. cloudless afterwards.                                                    |
| 8     | ..                    | 0.35                            | E. & W.                           | Cloudy & constantly raining in the afternoon.                                                                              |
| 9     | <i>Sunday.</i>        | 1.25                            |                                   |                                                                                                                            |
| 10    | ..                    | ..                              | S. E. & S.                        | Cloudy, & slightly drizzling between 3 & 4 A. M. & also at 9 A. M.                                                         |
| 11    | ..                    | ..                              | S.                                | Scatd. clouds till 6 P. M. cloudless afterwards.                                                                           |
| 12    | 130.4                 | ..                              | S.                                | Cloudless till 8 A. M. Scatd. clouds till 6 P. M. cloudless afterwards.                                                    |
| 13    | ..                    | ..                              | S. & S. E. & S. W.                | Cloudless till 5 A. M. Scatd. \i till 9 A. M. cloudy till 9 P. M. cloudless afterwards; also drizzling between 4 & 5 P. M. |
| 14    | ..                    | ..                              | S.                                | Cloudless till 6 A. M. Scatd. clouds till 6 P. M. cloudless afterwards.                                                    |
| 15    | ..                    | 1.02                            | S. E. & S.                        | Cloudy till 7 P. M. cloudless afterwards; also raining at 1 & 3 & 4 P. M.                                                  |
| 16    | <i>Sunday.</i>        |                                 |                                   |                                                                                                                            |
| 17    | ..                    | ..                              | S. E. & S.                        | Cloudy till 7 P. M. cloudless afterwards; also slightly drizzling at 1 P. M.                                               |
| 18    | ..                    | 0.21                            | E.                                | Cloudless till 5 A. M. cloudy afterwards; also constantly drizzling between 2 & 8 P. M.                                    |
| 19    | ..                    | 0.58                            | E. & N. E.                        | Cloudy; also constantly raining between 1 & 9 P. M.                                                                        |
| 20    | ..                    | 0.30                            | S. W. & S. & E.                   | Cloudy; also constantly drizzling between 1 & 4 A. M. & also at 4 P. M.                                                    |
| 21    | ..                    | ..                              | S. W. & W. & N.                   | Scatd. clouds till 4 P. M. Scatd. \i afterwards.                                                                           |
| 22    | 139.7                 | ..                              | N. & S.                           | Cloudless till 8 A. M. Scatd. \i till 8 P. M. cloudless afterwards.                                                        |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September, 1860.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                               |
|-------|-----------------------|---------------------------------|-----------------------------------|------------------------------------------------------------------------------------------|
| 23    | <i>Sunday.</i>        |                                 |                                   |                                                                                          |
| 24    | 125.0                 | 0.09                            | S.                                | Cloudy, also drizzling at 9 A. M. & 5 & 6 P. M.                                          |
| 25    | 135.0                 | ..                              | S. & S. E.                        | Scatd. clouds; also slightly drizzling at 10 A. M.                                       |
| 26    | ..                    | 1.07                            | S. W. & E. & N.                   | Cloudless till 8 A. M. cloudy afterwards; also raining at 11 A. M. & between 1 & 3 P. M. |
| 27    | ..                    | 0.09                            | S. & E.                           | Cloudy; also drizzling at 2 & 6 & 7 P. M.                                                |
| 28    | ..                    | 1.46                            | E. & S. W. & S. E.                | Scatd. clouds; also raining between 8 & 9 P. M.                                          |
| 29    | ..                    | ..                              | E. & S. E. & S.                   | Cloudless till 5 A. M. Scatd. clouds afterwards.                                         |
| 30    | <i>Sunday.</i>        |                                 |                                   |                                                                                          |

∇i Cirri, ∟i Cirro strati, ∪i Cumuli, ∟ Cumulo strati, ∟i Nimbi, —i Strati  
∟i Cirro cumuli.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September, 1860.*

MONTHLY RESULTS.

|                                                                |    |    | Inches |
|----------------------------------------------------------------|----|----|--------|
| Mean height of the Barometer for the month,                    | .. | .. | 29.667 |
| Max. height of the Barometer occurred at 10 A. M. on the 28th, | .. | .. | 29.796 |
| Min. height of the Barometer occurred at 4 A. M. on the 20th,  | .. | .. | 29.417 |
| <i>Extreme range</i> of the Barometer during the month,        | .. | .. | 0.379  |
| Mean of the Daily Max. Pressures,                              | .. | .. | 29.730 |
| Ditto ditto Min. ditto,                                        | .. | .. | 29.600 |
| <i>Mean daily range</i> of the Barometer during the month,     | .. | .. | 0.130  |

---

|                                                              |    |    | °    |
|--------------------------------------------------------------|----|----|------|
| Mean Dry Bulb Thermometer for the month,                     | .. | .. | 83.4 |
| Max. Temperature occurred at 2 & 3 P. M. on the 22nd & 29th, | .. | .. | 91.2 |
| Min. Temperature occurred at 4 A. M. on the 21st,            | .. | .. | 77.2 |
| <i>Extreme range</i> of the Temperature during the month,    | .. | .. | 14.0 |
| Mean of the daily Max. Temperature,                          | .. | .. | 88.5 |
| Ditto ditto Min. ditto,                                      | .. | .. | 80.3 |
| <i>Mean daily range</i> of the Temperature during the month, | .. | .. | 8.2  |
| Mean Wet Bulb Thermometer for the month, ..                  | .. | .. | 80.4 |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer,   | .. | .. | 3.0  |
| Computed Mean Dew-point for the month, ..                    | .. | .. | 78.9 |
| Mean Dry Bulb Thermometer above computed Mean Dew-point,     | .. | .. | 4.5  |

---

|                                                |    |    | Inches |
|------------------------------------------------|----|----|--------|
| Mean Elastic force of Vapour for the month, .. | .. | .. | 0.967  |

---

|                                                                         |    |    | Troy grains |
|-------------------------------------------------------------------------|----|----|-------------|
| Mean Weight of Vapour for the month, ..                                 | .. | .. | 10.37       |
| Additional Weight of Vapour required for complete saturation,           | .. | .. | 1.59        |
| Mean degree of humidity for the month, complete saturation being unity, | .. | .. | 0.87        |

---

|                                                    |    |    | Inches          |
|----------------------------------------------------|----|----|-----------------|
| Rained 19 days, Max. fall of rain during 24 hours, | .. | .. | 1.46            |
| Total amount of rain during the month,             | .. | .. | 7.13            |
| Prevailing direction of the Wind, ..               | .. | .. | S. & E. & S. E. |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September, 1860.*

## MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind  
blew, together with the number of days on which at the same hour,  
when any particular wind was blowing, it rained.

| Hour.     | N.           | Rain on.<br>N. | E. | Rain on.<br>E. | S. | Rain on.<br>S. | S. W. | Rain on.<br>S. W. | W. | Rain on.<br>W. | N. W. | Rain on.<br>N. W. | Calm. | Rain on. | Missed. |
|-----------|--------------|----------------|----|----------------|----|----------------|-------|-------------------|----|----------------|-------|-------------------|-------|----------|---------|
|           | No. of days. |                |    |                |    |                |       |                   |    |                |       |                   |       |          |         |
| Midnight. | 1            |                |    | 3              |    | 4              |       | 12                |    | 2              |       |                   |       |          | 2       |
| 1         | 1            |                |    | 3              | 1  | 4              |       | 14                |    | 2              |       |                   |       | 1        |         |
| 2         | 1            |                |    | 3              | 1  | 4              |       | 13                |    | 2              |       |                   |       |          | 1       |
| 3         | 1            | 1              |    | 4              | 1  | 2              | 1     | 15                |    | 2              |       |                   |       | 1        |         |
| 4         | 1            |                |    | 4              | 1  | 2              | 1     | 13                |    | 1              |       |                   |       |          | 4       |
| 5         | 1            | 1              |    | 4              |    | 2              |       | 13                |    | 2              |       |                   |       |          | 2       |
| 6         | 1            | 3              |    | 3              |    | 6              |       | 11                |    |                | 1     |                   |       |          |         |
| 7         |              | 3              |    | 7              |    | 6              |       | 8                 |    | 1              | 1     |                   |       |          |         |
| 8         |              | 1              |    | 9              |    | 6              |       | 5                 |    |                |       |                   |       |          | 3       |
| 9         |              | 1              |    | 9              |    | 7              |       | 6                 | 1  | 1              | 1     |                   |       |          |         |
| 10        |              | 1              |    | 8              | 1  | 4              | 1     | 10                |    | 2              |       |                   |       |          |         |
| 11        |              | 1              |    | 6              | 2  | 8              |       | 8                 |    | 2              |       |                   |       |          |         |
| Noon.     |              |                | 2  | 4              | 2  | 6              |       | 12                |    |                | 1     |                   |       |          |         |
| 1         | 1            | 3              | 2  | 5              | 5  | 2              | 8     | 1                 | 1  | 1              |       | 1                 |       |          |         |
| 2         | 1            | 3              | 1  | 2              | 1  | 6              | 9     | 1                 | 2  | 1              | 1     |                   | 1     |          |         |
| 3         | 1            | 1              | 2  | 3              | 1  | 5              | 2     | 8                 | 4  | 2              | 1     | 1                 |       |          |         |
| 4         | 1            | 2              | 1  | 4              | 1  | 3              | 1     | 7                 | 1  | 3              | 1     | 2                 |       |          |         |
| 5         |              | 1              | 1  | 7              | 3  | 3              |       | 7                 | 4  | 1              |       |                   |       |          | 2       |
| 6         | 2            | 1              |    | 6              | 1  | 4              |       | 7                 | 1  | 4              |       | 1                 | 1     |          |         |
| 7         | 2            |                |    | 5              | 1  | 4              |       | 9                 | 1  | 4              |       | 1                 | 1     |          |         |
| 8         | 2            |                |    | 4              | 2  | 4              |       | 10                |    | 3              | 1     | 1                 |       | 1        |         |
| 9         | 2            |                |    | 3              | 1  | 4              |       | 10                |    | 3              | 1     | 1                 |       | 1        |         |
| 10        | 2            |                |    | 5              |    | 4              |       | 10                |    | 3              |       | 1                 |       |          | 1       |
| 11        | 2            |                |    | 5              |    | 4              |       | 10                |    | 3              |       | 1                 |       |          |         |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October, 1860.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Feet.

Height of the Cistern of the Standard Barometer above the Sea level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | o                             | o                                             | o    | o     |
| 1     | 29.659                                          | 29.717                                    | 29.600  | 0.117   | 82.1                          | 88.2                                          | 80.0 | 8.2   |
| 2     | .632                                            | .679                                      | .570    | .109    | 80.8                          | 83.4                                          | 78.7 | 4.7   |
| 3     | .646                                            | .697                                      | .594    | .103    | 83.5                          | 87.8                                          | 80.0 | 7.8   |
| 4     | .712                                            | .766                                      | .655    | .111    | 82.9                          | 85.8                                          | 81.0 | 4.8   |
| 5     | .760                                            | .810                                      | .706    | .104    | 83.4                          | 88.5                                          | 79.6 | 8.9   |
| 6     | .831                                            | .883                                      | .786    | .097    | 84.5                          | 91.2                                          | 79.4 | 11.8  |
| 7     | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 8     | .851                                            | .927                                      | .810    | .117    | 84.1                          | 89.4                                          | 79.2 | 10.2  |
| 9     | .816                                            | .885                                      | .743    | .142    | 81.7                          | 84.6                                          | 79.6 | 5.0   |
| 10    | .807                                            | .872                                      | .760    | .112    | 80.0                          | 81.6                                          | 78.4 | 3.2   |
| 11    | .848                                            | .920                                      | .792    | .128    | 82.9                          | 88.3                                          | 78.8 | 9.5   |
| 12    | .874                                            | .940                                      | .811    | .129    | 82.9                          | 89.0                                          | 78.8 | 10.2  |
| 13    | .890                                            | .959                                      | .829    | .130    | 83.0                          | 90.4                                          | 79.0 | 11.4  |
| 14    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 15    | .848                                            | .925                                      | .794    | .131    | 82.7                          | 90.4                                          | 79.6 | 10.8  |
| 16    | .847                                            | .917                                      | .792    | .125    | 82.6                          | 87.6                                          | 79.2 | 8.4   |
| 17    | .849                                            | .916                                      | .801    | .115    | 83.2                          | 89.4                                          | 79.0 | 10.4  |
| 18    | .872                                            | .946                                      | .817    | .129    | 82.5                          | 89.2                                          | 77.2 | 12.0  |
| 19    | .876                                            | .950                                      | .827    | .123    | 81.6                          | 88.4                                          | 75.4 | 13.0  |
| 20    | .855                                            | .921                                      | .811    | .110    | 81.5                          | 88.6                                          | 74.8 | 13.8  |
| 21    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 22    | .865                                            | .945                                      | .809    | .136    | 82.4                          | 89.0                                          | 76.4 | 12.6  |
| 23    | .857                                            | .933                                      | .802    | .131    | 81.3                          | 86.4                                          | 76.4 | 10.0  |
| 24    | .859                                            | .930                                      | .809    | .121    | 81.8                          | 88.8                                          | 75.4 | 13.4  |
| 25    | .854                                            | .933                                      | .791    | .142    | 82.0                          | 88.8                                          | 75.8 | 13.0  |
| 26    | .827                                            | .908                                      | .758    | .150    | 81.0                          | 87.8                                          | 76.0 | 11.8  |
| 27    | .801                                            | .870                                      | .737    | .133    | 78.8                          | 85.0                                          | 72.6 | 12.4  |
| 28    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 29    | .749                                            | .802                                      | .702    | .100    | 79.3                          | 85.2                                          | 74.4 | 10.8  |
| 30    | .780                                            | .840                                      | .719    | .121    | 80.3                          | 87.2                                          | 74.6 | 12.6  |
| 31    | .800                                            | .871                                      | .741    | .130    | 79.1                          | 85.8                                          | 74.0 | 11.8  |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the twenty-four hourly observations made during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October, 1860.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Date. | Mean Wet Bulb Thermo-<br>meter. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a cubic foot of Air. | Additional Weight of Va-<br>pour required for com-<br>plete saturation. | Mean degree of Humidity,<br>complete saturation be-<br>ing unity. |
|-------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------|
|       | °                               | °                   | °                   | °                            | Inches.                          | T. gr.                                           | T. gr.                                                                  |                                                                   |
| 1     | 80.0                            | 2.1                 | 78.9                | 3.2                          | 0.967                            | 10.41                                            | 1.10                                                                    | 0.90                                                              |
| 2     | 78.7                            | 2.1                 | 77.6                | 3.2                          | .928                             | .01                                              | .06                                                                     | .90                                                               |
| 3     | 79.5                            | 4.0                 | 77.5                | 6.0                          | .925                             | 9.92                                             | 2.08                                                                    | .83                                                               |
| 4     | 78.6                            | 4.3                 | 76.4                | 6.5                          | .893                             | .58                                              | .21                                                                     | .81                                                               |
| 5     | 79.3                            | 4.1                 | 77.2                | 6.2                          | .916                             | .83                                              | .13                                                                     | .82                                                               |
| 6     | 79.1                            | 5.4                 | 76.4                | 8.1                          | .893                             | .56                                              | .79                                                                     | .77                                                               |
| 7     | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 8     | 78.9                            | 5.2                 | 76.3                | 7.8                          | .890                             | .53                                              | .68                                                                     | .78                                                               |
| 9     | 79.1                            | 2.6                 | 77.8                | 3.9                          | .934                             | 10.05                                            | 1.32                                                                    | .88                                                               |
| 10    | 77.9                            | 2.1                 | 76.8                | 3.2                          | .905                             | 9.77                                             | .04                                                                     | .90                                                               |
| 11    | 78.5                            | 4.4                 | 76.3                | 6.6                          | .890                             | .55                                              | 2.24                                                                    | .81                                                               |
| 12    | 78.6                            | 4.3                 | 76.4                | 6.5                          | .893                             | .58                                              | .21                                                                     | .81                                                               |
| 13    | 79.1                            | 3.9                 | 77.1                | 5.9                          | .913                             | .80                                              | .02                                                                     | .83                                                               |
| 14    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 15    | 78.8                            | 3.9                 | 76.8                | 5.9                          | .905                             | .71                                              | .01                                                                     | .83                                                               |
| 16    | 79.1                            | 3.5                 | 77.3                | 5.3                          | .919                             | .88                                              | 1.80                                                                    | .85                                                               |
| 17    | 78.2                            | 5.0                 | 75.7                | 7.5                          | .873                             | .36                                              | 2.53                                                                    | .79                                                               |
| 18    | 76.2                            | 6.3                 | 73.0                | 9.5                          | .801                             | 8.58                                             | 3.06                                                                    | .74                                                               |
| 19    | 74.7                            | 6.9                 | 71.2                | 10.4                         | .756                             | .13                                              | .21                                                                     | .72                                                               |
| 20    | 75.6                            | 5.9                 | 72.6                | 8.9                          | .790                             | .50                                              | 2.81                                                                    | .75                                                               |
| 21    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 22    | 75.9                            | 6.5                 | 72.6                | 9.8                          | .790                             | .49                                              | 3.12                                                                    | .73                                                               |
| 23    | 75.5                            | 5.8                 | 72.6                | 8.7                          | .790                             | .50                                              | 2.74                                                                    | .76                                                               |
| 24    | 75.7                            | 6.1                 | 72.6                | 9.2                          | .790                             | .50                                              | .90                                                                     | .75                                                               |
| 25    | 76.2                            | 5.8                 | 73.3                | 8.7                          | .809                             | .68                                              | .79                                                                     | .76                                                               |
| 26    | 73.2                            | 7.8                 | 69.3                | 11.7                         | .711                             | 7.64                                             | 3.50                                                                    | .69                                                               |
| 27    | 71.1                            | 7.7                 | 67.2                | 11.6                         | .664                             | .17                                              | .27                                                                     | .69                                                               |
| 28    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 29    | 74.4                            | 4.9                 | 71.9                | 7.4                          | .773                             | 8.36                                             | 2.23                                                                    | .79                                                               |
| 30    | 74.7                            | 5.6                 | 71.9                | 8.4                          | .773                             | .34                                              | .57                                                                     | .76                                                               |
| 31    | 71.2                            | 7.9                 | 67.2                | 11.9                         | .664                             | 7.17                                             | 3.36                                                                    | .68                                                               |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer for<br>each hour during the<br>month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture for each hour<br>during the<br>month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|---------------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                                | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | o                             | o                                                                   | o    | o     |
| Mid-<br>night. | 29.803                                          | 29.888                                                       | 29.655  | 0.233   | 79.6                          | 83.2                                                                | 76.6 | 6.6   |
| 1              | .795                                            | .880                                                         | .633    | .247    | 79.3                          | 82.8                                                                | 75.6 | 7.2   |
| 2              | .789                                            | .873                                                         | .621    | .252    | 78.8                          | 82.5                                                                | 74.6 | 7.9   |
| 3              | .788                                            | .850                                                         | .623    | .227    | 78.4                          | 82.3                                                                | 74.0 | 8.3   |
| 4              | .785                                            | .869                                                         | .613    | .256    | 78.3                          | 82.6                                                                | 73.5 | 9.1   |
| 5              | .810                                            | .884                                                         | .613    | .271    | 77.6                          | 81.2                                                                | 72.6 | 8.6   |
| 6              | .818                                            | .900                                                         | .635    | .265    | 77.8                          | 82.2                                                                | 72.8 | 9.4   |
| 7              | .839                                            | .919                                                         | .658    | .261    | 78.3                          | 81.8                                                                | 73.2 | 8.6   |
| 8              | .857                                            | .945                                                         | .682    | .263    | 80.4                          | 84.0                                                                | 75.4 | 8.6   |
| 9              | .875                                            | .956                                                         | .679    | .277    | 82.4                          | 85.4                                                                | 78.4 | 7.0   |
| 10             | .873                                            | .959                                                         | .671    | .288    | 83.7                          | 87.0                                                                | 79.2 | 7.8   |
| 11             | .855                                            | .944                                                         | .663    | .281    | 85.2                          | 88.2                                                                | 79.2 | 9.0   |
| Noon.          | .831                                            | .909                                                         | .647    | .262    | 86.3                          | 89.6                                                                | 79.4 | 10.2  |
| 1              | .806                                            | .885                                                         | .604    | .281    | 86.7                          | 90.6                                                                | 80.2 | 10.4  |
| 2              | .779                                            | .851                                                         | .589    | .262    | 86.9                          | 91.2                                                                | 81.3 | 9.9   |
| 3              | .766                                            | .837                                                         | .570    | .267    | 86.4                          | 90.4                                                                | 81.2 | 9.2   |
| 4              | .761                                            | .835                                                         | .580    | .255    | 86.0                          | 89.3                                                                | 81.6 | 7.7   |
| 5              | .761                                            | .835                                                         | .586    | .249    | 84.9                          | 89.2                                                                | 81.2 | 8.0   |
| 6              | .772                                            | .856                                                         | .599    | .257    | 83.2                          | 86.2                                                                | 80.4 | 5.8   |
| 7              | .791                                            | .887                                                         | .611    | .276    | 82.0                          | 85.4                                                                | 78.8 | 6.6   |
| 8              | .806                                            | .893                                                         | .648    | .245    | 81.2                          | 84.2                                                                | 77.6 | 6.6   |
| 9              | .821                                            | .896                                                         | .657    | .239    | 80.7                          | 83.6                                                                | 76.4 | 7.2   |
| 10             | .825                                            | .903                                                         | .673    | .230    | 80.2                          | 83.6                                                                | 76.0 | 7.6   |
| 11             | .828                                            | .903                                                         | .674    | .229    | 79.8                          | 83.6                                                                | 75.2 | 8.4   |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the observations made at the several hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Hour.          | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force<br>of Vapour. | Mean Weight of Va-<br>pour in a Cubic<br>foot of Air. | Additional Weight of<br>Vapour required<br>for complete satu-<br>ration. | Mean degree of Hu-<br>midity, complete<br>saturation being<br>unity. |
|----------------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------|
|                | o                               | o                   | o                   | o                            | Inches.                          | Troy grs.                                             | Troy grs.                                                                |                                                                      |
| Mid-<br>night. | 76.9                            | 2.7                 | 75.5                | 4.1                          | .863                             | 9.38                                                  | 1.31                                                                     | 0.88                                                                 |
| 1              | 77.0                            | 2.3                 | 75.8                | 3.5                          | .876                             | .46                                                   | .13                                                                      | .89                                                                  |
| 2              | 76.5                            | 2.3                 | 75.3                | 3.5                          | .862                             | .32                                                   | .12                                                                      | .89                                                                  |
| 3              | 76.2                            | 2.2                 | 75.1                | 3.3                          | .857                             | .28                                                   | .03                                                                      | .90                                                                  |
| 4              | 76.2                            | 2.1                 | 75.1                | 3.2                          | .857                             | .28                                                   | .00                                                                      | .90                                                                  |
| 5              | 75.5                            | 2.1                 | 74.4                | 3.2                          | .838                             | .10                                                   | 0.97                                                                     | .90                                                                  |
| 6              | 75.8                            | 2.0                 | 74.8                | 3.0                          | .849                             | .20                                                   | .93                                                                      | .91                                                                  |
| 7              | 76.1                            | 2.2                 | 75.0                | 3.3                          | .854                             | .25                                                   | 1.03                                                                     | .90                                                                  |
| 8              | 76.5                            | 3.9                 | 74.5                | 5.9                          | .840                             | .07                                                   | .87                                                                      | .83                                                                  |
| 9              | 77.1                            | 5.3                 | 74.4                | 8.0                          | .838                             | .00                                                   | 2.61                                                                     | .78                                                                  |
| 10             | 77.2                            | 6.5                 | 73.9                | 9.8                          | .824                             | 8.83                                                  | 3.24                                                                     | .73                                                                  |
| 11             | 77.6                            | 7.6                 | 73.8                | 11.4                         | .822                             | .78                                                   | .83                                                                      | .70                                                                  |
| Noon.          | 77.7                            | 8.6                 | 73.4                | 12.9                         | .811                             | .64                                                   | 4.38                                                                     | .66                                                                  |
| 1              | 77.7                            | 9.0                 | 73.2                | 13.5                         | .806                             | .57                                                   | .61                                                                      | .65                                                                  |
| 2              | 77.7                            | 9.2                 | 73.1                | 13.8                         | .803                             | .54                                                   | .71                                                                      | .65                                                                  |
| 3              | 77.3                            | 9.1                 | 72.7                | 13.7                         | .792                             | .44                                                   | .62                                                                      | .65                                                                  |
| 4              | 77.1                            | 8.9                 | 72.6                | 13.4                         | .790                             | .43                                                   | .48                                                                      | .65                                                                  |
| 5              | 77.2                            | 7.7                 | 73.3                | 11.6                         | .809                             | .63                                                   | 3.86                                                                     | .69                                                                  |
| 6              | 77.6                            | 5.6                 | 74.8                | 8.4                          | .849                             | 9.11                                                  | 2.78                                                                     | .77                                                                  |
| 7              | 77.4                            | 4.6                 | 75.1                | 6.9                          | .857                             | .21                                                   | .26                                                                      | .80                                                                  |
| 8              | 77.2                            | 4.0                 | 75.2                | 6.0                          | .860                             | .26                                                   | 1.95                                                                     | .83                                                                  |
| 9              | 77.1                            | 3.6                 | 75.3                | 5.4                          | .862                             | .31                                                   | .73                                                                      | .84                                                                  |
| 10             | 76.9                            | 3.3                 | 75.2                | 5.0                          | .860                             | .28                                                   | .60                                                                      | .85                                                                  |
| 11             | 76.7                            | 3.1                 | 75.1                | 4.7                          | .857                             | .25                                                   | .50                                                                      | .86                                                                  |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October, 1860.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                                    |
|-------|-----------------------|---------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------|
|       | o                     | Inches.                         |                                   |                                                                                                               |
| 1     | ...                   | 0.42                            | S.                                | Scatd. $\searrow$ i till 6 A. M. cloudy afterwards also raining at Noon & 1 & 3 P. M.                         |
| 2     | ...                   | ..                              | S. & E.                           | Cloudy also drizzling at 3 & 4 & 7 P. M.                                                                      |
| 3     | 136.0                 | ...                             | S.                                | Scatd. clouds.                                                                                                |
| 4     | ...                   | ...                             | S. W. & S.                        | Cloudy.                                                                                                       |
| 5     | 135.4                 | ...                             | S. W. & S.                        | Cloudy till 7 A. M. Scatd. clouds till 4 P. M. Scatd. $\searrow$ i afterwards.                                |
| 6     | 144.0                 | ...                             | S. W. & N. E. & N.                | Scatd. $\searrow$ i till 3 P. M. cloudless afterwards.                                                        |
| 7     | <i>Sunday.</i>        | ...                             |                                   |                                                                                                               |
| 8     | 137.0                 | ...                             | S. & W. & S. W.                   | Cloudless till 8 A. M. Scatd. clouds till 6 P. M. cloudless afterwards.                                       |
| 9     | ...                   | ...                             | N. & S. W.                        | Scatd. $\searrow$ i till 5 A. M. cloudy till 6 P. M. cloudless afterwards also drizzling between 6 & 9 A. M.  |
| 10    | ...                   | 1.26                            | S. W. & S.                        | Cloudy, also raining after intervals between 2 & 10 A. M.                                                     |
| 11    | 139.0                 | ...                             | S. & E. & S. W.                   | Scatd. $\searrow$ i.                                                                                          |
| 12    | 127.6                 | ...                             | W. & S. E. & E.                   | Scatd clouds.                                                                                                 |
| 13    | 147.0                 | ...                             | S.                                | Cloudless till 6 A. M. Scatd. clouds till 6 P. M. cloudless afterwards, also slightly drizzling at 3 P. M.    |
| 14    | <i>Sunday.</i>        | ...                             |                                   |                                                                                                               |
| 15    | 149.0                 | ...                             | S.                                | Cloudless till 8 A. M. Scatd. clouds till 9 P. M. cloudless afterwards.                                       |
| 16    | 125.0                 | ...                             | S. & W.                           | Cloudless till 5 A. M. Scatd. clouds till 6 P. M. cloudless afterwards, also drizzling between noon & 1 P. M. |
| 17    | 142.2                 | ...                             | W. & S. & S. W.                   | Cloudless till 5 A. M. Scatd. clouds till 2 P. M. cloudless afterwards.                                       |
| 18    | 140.0                 | ...                             | S. W & S. & W.                    | Cloudless.                                                                                                    |
| 19    | 141.7                 | ...                             | W. & N. W. & S. }<br>W. & N. E. } | Cloudless.                                                                                                    |
| 20    | 140.0                 | ...                             | N. E. & W. & S.                   | Cloudless till 10 A. M. Scatd. clouds afterwards.                                                             |
| 21    | <i>Sunday.</i>        | ...                             |                                   |                                                                                                               |
| 22    | 148.4                 | ...                             | S. E. & N. E.                     | Cloudless till 8 A. M. Scatd. $\nearrow$ i & $\searrow$ i afterwards.                                         |
| 23    | ...                   | ...                             | S. & E.                           | Scatd. $\searrow$ i till 4 A. M. cloudless till 9 A. M. Scatd. clouds till 4 P. M. cloudless afterwards.      |
| 24    | 146.0                 | ...                             | N. E. & N. & W.                   | Cloudless till 11 A. M. Scatd $\nearrow$ i till 4 P. M. cloudless afterwards.                                 |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October, 1860.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                    |
|-------|-----------------------|---------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------|
|       |                       | Inches.                         |                                   |                                                                                               |
| 25    | 140.0                 | ...                             | N. & N. W.                        | Cloudless till 10 A. M. Scatd. $\searrow$ i & $\swarrow$ i till 9 P. M. cloudless afterwards. |
| 26    | 143.0                 | ...                             | N. & N. W.                        | Cloudless till 6 A. M. Scatd. $\searrow$ i till 3 P. M. cloudless afterwards.                 |
| 27    | 123.0                 | ...                             | N. & N. W.                        | Scatd. $\searrow$ i & $\swarrow$ i.                                                           |
| 28    | <i>Sunday.</i>        | ...                             |                                   |                                                                                               |
| 29    | ...                   | ...                             | N.                                | Scatd. $\searrow$ i till 6 A. M. cloudy afterwards.                                           |
| 30    | 144.0                 | ...                             | N. W. & N.                        | Scatd. $\searrow$ i & $\swarrow$ i till 9 P. M. cloudless afterwards.                         |
| 31    | 140.0                 | ..                              | N. & W.                           | Cloudless till 5 A. M. Scatd. $\searrow$ i & $\swarrow$ i till 4 P. M. cloudless afterwards.  |

$\searrow$ i Cirri,  $\swarrow$ i Cirro strati,  $\searrow$ i Cumuli,  $\searrow$ i Cumulo strati,  $\swarrow$ i Nimbi,—i Strati,  $\swarrow$ i Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October, 1860.*

MONTHLY RESULTS.

|                                                                 |    |    | Inches. |
|-----------------------------------------------------------------|----|----|---------|
| Mean height of the Barometer for the month,                     | .. | .. | 29.810  |
| Max. height of the Barometer, occurred at 10 A. M. on the 13th, | .. | .. | 29.959  |
| Min. height of the Barometer, occurred at 3 P. M. on the 2nd,   | .. | .. | 29.570  |
| <i>Extreme range</i> of the Barometer during the month,         | .. | .. | 0.389   |
| Mean of the Daily Max. Pressures,                               | .. | .. | 29.876  |
| Ditto ditto Min. ditto,                                         | .. | .. | 29.754  |
| <i>Mean daily range</i> of the Barometer during the month,      | .. | .. | 0.122   |

---

|                                                              |    |    | o    |
|--------------------------------------------------------------|----|----|------|
| Mean Dry Bulb Thermometer for the month,                     | .. | .. | 81.9 |
| Max. Temperature occurred at 2 P. M. on the 6th,             | .. | .. | 91.2 |
| Min. Temperature occurred at 5 A. M. on the 27th,            | .. | .. | 72.6 |
| <i>Extreme range</i> of the Temperature during the month,    | .. | .. | 18.6 |
| Mean of the daily Max. Temperature,                          | .. | .. | 87.6 |
| Ditto ditto Min. ditto,                                      | .. | .. | 77.5 |
| <i>Mean daily range</i> of the Temperature during the month, | .. | .. | 10.1 |

---

|                                                              |    |    | o      |
|--------------------------------------------------------------|----|----|--------|
| Mean Wet Bulb Thermometer for the month,                     | .. | .. | 76.9   |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer,.. |    |    | 5.0    |
| Computed Mean Dew Point for the month,                       | .. | .. | 74.4   |
| Mean Dry Bulb Thermometer above computed Mean Dew-point, ..  |    |    | 7.5    |
|                                                              |    |    | Inches |
| Mean Elastic force of vapour for the month, ..               | .. | .. | 0.838  |

---

|                                                                         |    |    | Troy grains |
|-------------------------------------------------------------------------|----|----|-------------|
| Mean weight of Vapour for the month,                                    | .. | .. | 9.00        |
| Additional weight of Vapour required for complete saturation,           | .. | .. | 2.44        |
| Mean degree of humidity for the month, complete saturation being unity, |    |    | 0.79        |

---

|                                                   |    |    | Inches  |
|---------------------------------------------------|----|----|---------|
| Rained 6 days, Max. fall of rain during 24 hours, | .. | .. | 1.26    |
| Total amount of rain during the month,            | .. | .. | 1.68    |
| Prevailing direction of the Wind,                 | .. | .. | S. & N. |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October, 1860.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind  
blew, together with the number of days on which at the same hour,  
when any particular wind was blowing, it rained.

| Hour.     | N.           | Rain on. | N. E. | Rain on. | E. | Rain on. | S. E. | Rain on. | S. | Rain on. | S. W. | Rain on. | W. | Rain on. | N. W. | Rain on. | Calm. | Rain on. | Missed. |
|-----------|--------------|----------|-------|----------|----|----------|-------|----------|----|----------|-------|----------|----|----------|-------|----------|-------|----------|---------|
|           | No. of days. |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |         |
| Midnight. | 7            | 3        |       |          |    |          |       |          | 11 | 3        | 1     |          |    |          |       |          |       |          | 12      |
| 1         | 6            | 4        |       |          |    | 1        |       | 11       | 3  | 3        |       |          |    |          |       |          |       |          | 1       |
| 2         | 7            | 1        | 4     |          | 1  | 1        |       | 9        | 3  | 3        |       |          | 1  |          |       |          |       |          | 1       |
| 3         | 7            |          | 4     |          | 1  | 1        |       | 8        | 3  | 3        |       |          | 1  |          |       |          |       |          | 2       |
| 4         | 5            |          | 4     |          | 1  | 1        |       | 9        | 3  | 3        |       |          | 1  |          |       |          |       |          | 3       |
| 5         | 6            |          | 3     |          |    | 1        |       | 9        | 3  | 1        |       |          | 1  |          |       |          |       |          | 4       |
| 6         | 7            | 1        | 3     |          | 3  | 2        |       | 1        | 8  | 4        |       |          |    |          |       |          |       |          |         |
| 7         | 6            | 1        | 2     |          | 3  | 2        |       | 1        | 7  | 5        |       |          | 2  |          |       |          |       |          |         |
| 8         | 8            | 1        | 1     |          | 5  | 2        |       |          | 4  | 2        |       |          | 2  |          |       |          |       |          | 3       |
| 9         | 6            | 1        | 3     |          | 4  | 2        |       | 1        | 7  | 2        |       |          | 2  |          | 1     |          |       |          |         |
| 10        | 6            |          | 3     |          | 2  | 3        |       | 1        | 5  | 4        |       |          | 3  |          | 1     |          |       |          |         |
| 11        | 5            |          | 2     |          | 1  | 2        |       |          | 5  | 6        |       |          | 3  |          | 3     |          |       |          |         |
| Noon.     | 6            | 1        |       |          | 3  | 1        |       |          | 6  | 5        |       |          | 5  |          | 2     |          |       |          |         |
| 1         | 7            | 1        |       |          | 1  |          | 1     | 1        | 4  | 4        |       |          | 7  |          | 3     |          |       |          |         |
| 2         | 7            |          |       |          | 1  | 2        |       |          | 3  | 4        |       |          | 8  |          | 2     |          |       |          |         |
| 3         | 6            |          |       |          | 3  | 2        |       | 1        | 3  | 5        |       |          | 4  |          | 4     |          |       |          |         |
| 4         | 2            |          | 1     |          | 1  | 2        |       |          | 3  | 1        |       |          | 7  |          | 6     |          |       |          | 1       |
| 5         | 2            |          | 1     |          | 1  | 1        |       |          | 6  | 3        |       |          | 8  |          | 5     |          |       |          |         |
| 6         | 3            |          |       |          | 1  | 1        |       |          | 8  | 2        |       |          | 7  |          | 5     |          |       |          |         |
| 7         | 3            |          |       |          | 2  | 1        |       |          | 8  | 1        |       |          | 5  |          | 5     |          |       |          |         |
| 8         | 3            |          |       |          |    | 1        |       |          | 9  | 4        |       |          | 4  |          | 5     |          |       |          | 1       |
| 9         | 3            |          |       |          | 1  | 1        |       |          | 9  | 4        |       |          | 4  |          | 5     |          |       |          |         |
| 10        | 4            |          |       |          | 1  | 1        |       |          | 9  | 4        |       |          | 3  |          | 5     |          |       |          |         |
| 11        | 5            |          |       |          | 1  | 1        |       |          | 8  | 3        |       |          | 3  |          | 4     |          |       |          | 2       |



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November, 1860.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Feet.

Height of the Cistern of the Standard Barometer above the Sea level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | o                             | o                                             | o    | o     |
| 1     | 29.792                                          | 29.865                                    | 29.741  | 0.124   | 78.1                          | 85.5                                          | 71.8 | 13.7  |
| 2     | .813                                            | .888                                      | .772    | .116    | 77.1                          | 86.2                                          | 70.0 | 16.2  |
| 3     | .851                                            | .931                                      | .803    | .128    | 76.1                          | 85.8                                          | 68.0 | 17.8  |
| 4     | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 5     | .935                                            | .992                                      | .898    | .094    | 78.1                          | 85.4                                          | 71.8 | 13.6  |
| 6     | .913                                            | .968                                      | .856    | .112    | 78.8                          | 85.0                                          | 74.6 | 10.4  |
| 7     | .886                                            | .951                                      | .820    | .131    | 78.1                          | 85.6                                          | 73.0 | 12.6  |
| 8     | .880                                            | .947                                      | .825    | .122    | 78.9                          | 85.0                                          | 74.9 | 10.1  |
| 9     | .908                                            | .975                                      | .860    | .115    | 78.5                          | 86.2                                          | 72.4 | 13.8  |
| 10    | .939                                            | 30.000                                    | .877    | .123    | 77.8                          | 85.2                                          | 71.4 | 13.8  |
| 11    | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 12    | .964                                            | .043                                      | .891    | .152    | 77.8                          | 85.8                                          | 71.0 | 14.8  |
| 13    | .975                                            | .042                                      | .917    | .125    | 76.6                          | 85.5                                          | 69.6 | 15.9  |
| 14    | .960                                            | .034                                      | .889    | .145    | 76.7                          | 86.6                                          | 69.3 | 17.3  |
| 15    | .908                                            | 29.973                                    | .840    | .133    | 76.6                          | 86.6                                          | 69.5 | 17.1  |
| 16    | .874                                            | .923                                      | .820    | .103    | 78.0                          | 85.8                                          | 72.6 | 13.2  |
| 17    | .841                                            | .914                                      | .758    | .156    | 79.0                          | 87.2                                          | 73.2 | 14.0  |
| 18    | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 19    | .782                                            | .837                                      | .740    | .097    | 79.4                          | 88.6                                          | 72.8 | 15.8  |
| 20    | .871                                            | .939                                      | .806    | .133    | 78.1                          | 87.0                                          | 72.0 | 15.0  |
| 21    | .932                                            | 30.006                                    | .887    | .119    | 77.0                          | 85.6                                          | 70.8 | 14.8  |
| 22    | .958                                            | .029                                      | .913    | .116    | 72.5                          | 82.1                                          | 67.0 | 15.1  |
| 23    | .975                                            | .036                                      | .928    | .108    | 70.0                          | 80.9                                          | 62.9 | 18.0  |
| 24    | 30.001                                          | .079                                      | .951    | .128    | 69.6                          | 80.3                                          | 61.4 | 18.9  |
| 25    | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 26    | .028                                            | .087                                      | .978    | .109    | 69.9                          | 80.6                                          | 62.4 | 18.2  |
| 27    | .081                                            | .167                                      | 30.031  | .136    | 69.7                          | 81.2                                          | 60.4 | 20.8  |
| 28    | .077                                            | .149                                      | .017    | .132    | 69.4                          | 80.6                                          | 60.8 | 19.8  |
| 29    | .043                                            | .116                                      | 29.956  | .160    | 70.2                          | 80.4                                          | 62.8 | 17.6  |
| 30    | .017                                            | .106                                      | .938    | .168    | 70.9                          | 80.6                                          | 63.2 | 17.4  |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the twenty-four hourly observations made during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November, 1860.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Date. | Mean Wet Bulb Thermo-<br>meter. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a cubic foot of Air. | Additional Weight of Va-<br>pour required for com-<br>plete saturation. | Mean degree of Humidity,<br>complete saturation be-<br>ing unity. |
|-------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------|
|       | °                               | °                   | °                   | °                            | Inches.                          | T. gr.                                           | T. gr.                                                                  |                                                                   |
| 1     | 69.4                            | 8.7                 | 65.0                | 13.1                         | .617                             | 6.69                                             | 3.53                                                                    | 0.66                                                              |
| 2     | 69.2                            | 7.9                 | 65.2                | 11.9                         | .621                             | .74                                              | .18                                                                     | .68                                                               |
| 3     | 69.0                            | 7.1                 | 65.4                | 10.7                         | .626                             | .80                                              | 2.83                                                                    | .71                                                               |
| 4     | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 5     | 70.9                            | 7.2                 | 67.3                | 10.8                         | .666                             | 7.21                                             | 3.01                                                                    | .71                                                               |
| 6     | 73.2                            | 5.6                 | 70.4                | 8.4                          | .736                             | .97                                              | 2.47                                                                    | .76                                                               |
| 7     | 73.6                            | 4.5                 | 71.3                | 6.8                          | .758                             | 8.21                                             | .01                                                                     | .80                                                               |
| 8     | 73.7                            | 5.2                 | 71.1                | 7.8                          | .753                             | .15                                              | .32                                                                     | .78                                                               |
| 9     | 71.8                            | 6.7                 | 68.4                | 10.1                         | .690                             | 7.47                                             | .88                                                                     | .72                                                               |
| 10    | 71.0                            | 6.8                 | 67.6                | 10.2                         | .672                             | .29                                              | .84                                                                     | .72                                                               |
| 11    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 12    | 70.3                            | 7.5                 | 66.5                | 11.3                         | .648                             | .03                                              | 3.10                                                                    | .69                                                               |
| 13    | 69.0                            | 7.6                 | 65.2                | 11.4                         | .621                             | 6.76                                             | .01                                                                     | .69                                                               |
| 14    | 69.6                            | 7.1                 | 66.0                | 10.7                         | .638                             | .92                                              | 2.83                                                                    | .71                                                               |
| 15    | 69.9                            | 6.7                 | 66.5                | 10.1                         | .648                             | 7.05                                             | .72                                                                     | .72                                                               |
| 16    | 72.3                            | 5.7                 | 69.4                | 8.6                          | .713                             | .72                                              | .47                                                                     | .76                                                               |
| 17    | 73.9                            | 5.1                 | 71.3                | 7.7                          | .758                             | 8.20                                             | .30                                                                     | .78                                                               |
| 18    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 19    | 73.4                            | 6.0                 | 70.4                | 9.0                          | .736                             | 7.95                                             | .67                                                                     | .75                                                               |
| 20    | 70.4                            | 7.7                 | 66.5                | 11.6                         | .648                             | .02                                              | 3.20                                                                    | .69                                                               |
| 21    | 68.2                            | 8.8                 | 63.8                | 13.2                         | .593                             | 6.44                                             | .45                                                                     | .65                                                               |
| 22    | 64.8                            | 7.7                 | 60.9                | 11.6                         | .539                             | 5.90                                             | 2.73                                                                    | .68                                                               |
| 23    | 62.5                            | 7.5                 | 58.7                | 11.3                         | .501                             | .52                                              | .48                                                                     | .69                                                               |
| 24    | 61.4                            | 8.2                 | 57.3                | 12.3                         | .478                             | .26                                              | .64                                                                     | .67                                                               |
| 25    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 26    | 62.8                            | 7.1                 | 59.2                | 10.7                         | .509                             | .60                                              | .38                                                                     | .70                                                               |
| 27    | 60.6                            | 9.1                 | 56.0                | 13.7                         | .458                             | .03                                              | .90                                                                     | .63                                                               |
| 28    | 61.3                            | 8.1                 | 57.2                | 12.2                         | .476                             | .24                                              | .62                                                                     | .67                                                               |
| 29    | 63.5                            | 6.7                 | 60.1                | 10.1                         | .525                             | .77                                              | .28                                                                     | .72                                                               |
| 30    | 64.7                            | 6.2                 | 61.6                | 9.3                          | .552                             | 6.06                                             | .17                                                                     | .74                                                               |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer for<br>each hour during the<br>month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture for each hour<br>during the<br>month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|---------------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                                | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | o                             | o                                                                   | o    | o     |
| Mid-<br>night. | 29.926                                          | 30.092                                                       | 29.773  | 0.319   | 72.1                          | 76.8                                                                | 64.2 | 12.6  |
| 1              | .923                                            | .080                                                         | .768    | .312    | 71.3                          | 76.4                                                                | 63.3 | 13.1  |
| 2              | .915                                            | .070                                                         | .760    | .310    | 70.8                          | 76.0                                                                | 62.1 | 13.9  |
| 3              | .916                                            | .058                                                         | .760    | .298    | 70.1                          | 75.7                                                                | 61.0 | 14.7  |
| 4              | .905                                            | .057                                                         | .755    | .302    | 70.0                          | 75.0                                                                | 61.3 | 13.7  |
| 5              | .910                                            | .062                                                         | .765    | .297    | 69.4                          | 74.7                                                                | 61.2 | 13.5  |
| 6              | .936                                            | .083                                                         | .772    | .311    | 68.9                          | 75.0                                                                | 60.4 | 14.6  |
| 7              | .956                                            | .114                                                         | .796    | .318    | 69.3                          | 75.8                                                                | 61.2 | 14.6  |
| 8              | .983                                            | .138                                                         | .817    | .321    | 71.9                          | 77.8                                                                | 62.6 | 15.2  |
| 9              | .998                                            | .161                                                         | .836    | .325    | 74.6                          | 79.8                                                                | 66.4 | 13.4  |
| 10             | .995                                            | .167                                                         | .836    | .331    | 77.8                          | 81.8                                                                | 71.0 | 10.8  |
| 11             | .976                                            | .146                                                         | .837    | .309    | 80.4                          | 84.4                                                                | 74.6 | 9.8   |
| Noon.          | .950                                            | .114                                                         | .792    | .322    | 82.5                          | 86.3                                                                | 76.6 | 9.7   |
| 1              | .919                                            | .080                                                         | .767    | .313    | 83.8                          | 88.0                                                                | 79.4 | 8.6   |
| 2              | .896                                            | .046                                                         | .744    | .302    | 84.2                          | 88.6                                                                | 80.3 | 8.3   |
| 3              | .881                                            | .031                                                         | .740    | .291    | 83.6                          | 86.6                                                                | 79.2 | 7.4   |
| 4              | .876                                            | .034                                                         | .746    | .288    | 81.9                          | 85.2                                                                | 77.5 | 7.7   |
| 5              | .884                                            | .035                                                         | .740    | .295    | 79.9                          | 83.2                                                                | 75.0 | 8.2   |
| 6              | .894                                            | .039                                                         | .746    | .293    | 77.8                          | 82.2                                                                | 71.8 | 10.4  |
| 7              | .917                                            | .058                                                         | .773    | .285    | 75.8                          | 80.4                                                                | 70.0 | 10.4  |
| 8              | .932                                            | .074                                                         | .791    | .283    | 74.7                          | 79.4                                                                | 68.0 | 11.4  |
| 9              | .943                                            | .084                                                         | .798    | .286    | 73.7                          | 78.6                                                                | 66.9 | 11.7  |
| 10             | .948                                            | .091                                                         | .807    | .284    | 72.8                          | 77.9                                                                | 65.6 | 12.3  |
| 11             | .943                                            | .101                                                         | .803    | .298    | 72.4                          | 77.6                                                                | 64.8 | 12.8  |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Hour.          | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force<br>of Vapour. | Mean Weight of Va-<br>pour in a Cubic<br>foot of Air. | Additional Weight of<br>Vapour required<br>for complete satu-<br>ration. | Mean degree of Hu-<br>midity, complete<br>saturation being<br>unity. |
|----------------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------|
|                | o                               | o                   | o                   | o                            | Inches.                          | Troy grs.                                             | Troy grs.                                                                |                                                                      |
| Mid-<br>night. | 67.9                            | 4.2                 | 65.8                | 6.3                          | 0.634                            | 6.96                                                  | 1.57                                                                     | 0.82                                                                 |
| 1              | 67.3                            | 4.0                 | 65.3                | 6.0                          | .623                             | .85                                                   | .48                                                                      | .82                                                                  |
| 2              | 66.8                            | 4.0                 | 64.8                | 6.0                          | .613                             | .75                                                   | .45                                                                      | .82                                                                  |
| 3              | 66.2                            | 3.9                 | 64.2                | 5.9                          | .601                             | .61                                                   | .42                                                                      | .82                                                                  |
| 4              | 66.2                            | 3.8                 | 64.3                | 5.7                          | .603                             | .64                                                   | .36                                                                      | .83                                                                  |
| 5              | 65.8                            | 3.6                 | 64.0                | 5.4                          | .597                             | .58                                                   | .28                                                                      | .84                                                                  |
| 6              | 65.1                            | 3.8                 | 63.2                | 5.7                          | .582                             | .41                                                   | .33                                                                      | .83                                                                  |
| 7              | 65.2                            | 4.1                 | 63.1                | 6.2                          | .580                             | .39                                                   | .44                                                                      | .82                                                                  |
| 8              | 66.5                            | 5.4                 | 63.8                | 8.1                          | .593                             | .50                                                   | .98                                                                      | .77                                                                  |
| 9              | 68.0                            | 6.6                 | 64.7                | 9.9                          | .611                             | .66                                                   | 2.54                                                                     | .72                                                                  |
| 10             | 69.0                            | 8.8                 | 64.6                | 13.2                         | .609                             | .60                                                   | 3.53                                                                     | .65                                                                  |
| 11             | 70.1                            | 10.3                | 64.9                | 15.5                         | .615                             | .63                                                   | 4.31                                                                     | .61                                                                  |
|                |                                 |                     |                     |                              |                                  |                                                       |                                                                          |                                                                      |
| Noon.          | 70.5                            | 12.0                | 64.5                | 18.0                         | .607                             | .52                                                   | 5.12                                                                     | .56                                                                  |
| 1              | 71.0                            | 12.8                | 64.6                | 19.2                         | .609                             | .52                                                   | .58                                                                      | .54                                                                  |
| 2              | 71.0                            | 13.2                | 64.4                | 19.8                         | .605                             | .47                                                   | .77                                                                      | .53                                                                  |
| 3              | 70.7                            | 12.9                | 64.2                | 19.4                         | .601                             | .44                                                   | .59                                                                      | .54                                                                  |
| 4              | 70.3                            | 11.6                | 64.5                | 17.4                         | .607                             | .53                                                   | 4.91                                                                     | .57                                                                  |
| 5              | 70.3                            | 9.6                 | 65.5                | 14.4                         | .628                             | .78                                                   | .00                                                                      | .63                                                                  |
| 6              | 70.6                            | 7.2                 | 67.0                | 10.8                         | .659                             | 7.14                                                  | 2.99                                                                     | .71                                                                  |
| 7              | 69.9                            | 5.9                 | 66.9                | 8.9                          | .657                             | .15                                                   | .39                                                                      | .75                                                                  |
| 8              | 69.4                            | 5.3                 | 66.7                | 8.0                          | .653                             | .11                                                   | .12                                                                      | .77                                                                  |
| 9              | 69.0                            | 4.7                 | 66.6                | 7.1                          | .651                             | .11                                                   | 1.85                                                                     | .79                                                                  |
| 10             | 68.2                            | 4.6                 | 65.9                | 6.9                          | .636                             | 6.96                                                  | .75                                                                      | .80                                                                  |
| 11             | 67.9                            | 4.5                 | 65.6                | 6.8                          | .630                             | .90                                                   | .70                                                                      | .80                                                                  |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November, 1860.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                |
|-------|-----------------------|---------------------------------|-----------------------------------|---------------------------------------------------------------------------|
|       | °                     | Inches.                         |                                   |                                                                           |
| 1     | 149.4                 | ...                             | W. & N. & N. E.                   | Cloudless.                                                                |
| 2     | 142.0                 | ...                             | W. & N. E. & N.                   | Cloudless.                                                                |
| 3     | 144.5                 | ...                             | W. & S. W. & N. E.                | Cloudless.                                                                |
| 4     | <i>Sunday.</i>        | ...                             |                                   |                                                                           |
| 5     | 140.0                 | ..                              | N. & N. W. & W.                   | Cloudy till 7 A. M. Scatd. \i & \i afterwards.                            |
| 6     | ...                   | ...                             | N. & W.                           | Scatd. clouds.                                                            |
| 7     | ...                   | ...                             | E. & N. E. & N. W.                | Cloudless till 5 A. M. Scatd. clouds till 8 P. M. cloudless afterwards.   |
| 8     | 123.0                 | ...                             | N. & N. W.                        | Scatd. clouds till 5 P. M. cloudless afterwards.                          |
| 9     | 141.7                 | ...                             | N.                                | Cloudless.                                                                |
| 10    | 141.5                 | ...                             | N.                                | Cloudless till 11 A. M. Scatd. \i & \i afterwards.                        |
| 11    | <i>Sunday.</i>        | ...                             |                                   |                                                                           |
| 12    | 139.5                 | ...                             | N. W. & N.                        | Cloudless till 8 A. M. Scatd. \i till 4 P. M. cloudless afterwards.       |
| 13    | 144.5                 | ...                             | N. & W. & N. W.                   | Cloudless till 4 A. M. Scatd. \i & \i till 11 A. M. cloudless afterwards. |
| 14    | 142.0                 | ...                             | N. & N. W.                        | Cloudless till 11 A. M. Scatd. \i & \i till 6 P. M. cloudless afterwards. |
| 15    | 144.8                 | ...                             | N.                                | Cloudless till 7 A. M. Scatd. \i till 3 P. M. cloudless afterwards.       |
| 16    | 139.0                 | ...                             | N. & E.                           | Cloudless till 2 A. M. Scatd. \i & \i afterwards.                         |
| 17    | 146.0                 | ...                             | N. E.                             | Scatd. clouds.                                                            |
| 18    | <i>Sunday.</i>        | ...                             |                                   |                                                                           |
| 19    | 147.4                 | ...                             | N. & W.                           | Scatd. clouds till 6 P. M. cloudless afterwards.                          |
| 20    | 146.4                 | ...                             | N. & N. W.                        | Cloudless.                                                                |
| 21    | 144.4                 | ...                             | N.                                | Cloudless.                                                                |
| 22    | 139.0                 | ...                             | N. & N. W.                        | Cloudless.                                                                |
| 23    | 139.2                 | ...                             | N. W. & N.                        | Cloudless till 11 A. M. Scatd. \i & \i till 6 P. M. cloudless afterwards. |
| 24    | 141.0                 | ...                             | N. W. & N.                        | Cloudless.                                                                |
| 25    | <i>Sunday.</i>        | ...                             |                                   |                                                                           |
| 26    | 139.0                 | ...                             | N. W. & W.                        | Cloudless.                                                                |
| 27    | 138.0                 | ...                             | N. W. & W. & N.                   | Cloudless.                                                                |
| 28    | 140.0                 | ...                             | N. & W.                           | Cloudless.                                                                |
| 29    | 136.0                 | ..                              | N. W.                             | Cloudless till 5 A. M. Scatd. \i & \i afterwards.                         |
| 30    | 136.0                 | ...                             | N. W. & N. & S. W.                | Scatd. clouds of different kinds.                                         |

\i Cirri, \i Cirro strati, \i Cumuli, \i Cumulo strati, \i Nimbi,—i Strati  
\i Cirro cumuli.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November, 1860.*

MONTHLY RESULTS.

|                                                                    |    |    | Inches. |
|--------------------------------------------------------------------|----|----|---------|
| Mean height of the Barometer for the month,                        | .. | .. | 29.930  |
| Max. height of the Barometer, occurred at 10 A. M. on the 27th,    | .. | .. | 30.167  |
| Min. height of the Barometer, occurred at 3 & 5 P. M. on the 19th, | .. | .. | 29.740  |
| <i>Extreme range</i> of the Barometer during the month,            | .. | .. | 0.427   |
| Mean of the Daily Max. Pressures,                                  | .. | .. | 30.000  |
| Ditto ditto Min. ditto,                                            | .. | .. | 29.874  |
| <i>Mean daily range</i> of the Barometer during the month,         | .. | .. | 0.126   |

---

|                                                              |    |    | o    |
|--------------------------------------------------------------|----|----|------|
| Mean Dry Bulb Thermometer for the month,                     | .. | .. | 75.5 |
| Max. Temperature occurred at 2 P. M. on the 19th,            | .. | .. | 88.6 |
| Min. Temperature occurred at 6 A. M. on the 27th,            | .. | .. | 60.4 |
| <i>Extreme range</i> of the Temperature during the month,    | .. | .. | 28.2 |
| Mean of the daily Max. Temperature,                          | .. | .. | 84.4 |
| Ditto ditto Min. ditto,                                      | .. | .. | 68.8 |
| <i>Mean daily range</i> of the Temperature during the month, | .. | .. | 15.6 |

---

|                                                            |    |    | o      |
|------------------------------------------------------------|----|----|--------|
| Mean Wet Bulb Thermometer for the month,                   | .. | .. | 68.5   |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, | .. | .. | 7.0    |
| Computed Mean Dew-point for the month,                     | .. | .. | 65.0   |
| Mean Dry Bulb Thermometer above computed Mean Dew-point,   | .. | .. | 10.5   |
|                                                            |    |    | Inches |
| Mean Elastic force of vapour for the month,                | .. | .. | 0.617  |

---

|                                                                         |    |    | Troy grains |
|-------------------------------------------------------------------------|----|----|-------------|
| Mean weight of Vapour for the month,                                    | .. | .. | 6.72        |
| Additional weight of Vapour required for complete saturation,           | .. | .. | 2.74        |
| Mean degree of humidity for the month, complete saturation being unity, | .. | .. | 0.71        |

---

|                                                   |    |    | Inches     |
|---------------------------------------------------|----|----|------------|
| Rained No day, Max. fall of rain during 24 hours, | .. | .. | Nil.       |
| Total amount of rain during the month,            | .. | .. | Nil.       |
| Prevailing direction of the Wind,                 | .. | .. | N. & N. W. |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November, 1860.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind  
blew, together with the number of days on which at the same hour,  
when any particular wind was blowing, it rained.

| Hour.     | N.           | Rain on.<br>N. E. | E. | Rain on.<br>S. E. | S. | Rain on.<br>S. W. | W. | Rain on.<br>N. W. | Calm. | Missed. |
|-----------|--------------|-------------------|----|-------------------|----|-------------------|----|-------------------|-------|---------|
|           | No. of days. |                   |    |                   |    |                   |    |                   |       |         |
| Midnight. | 15           | 1                 |    |                   |    | 1                 | 3  | 4                 |       | 2       |
| 1         | 17           | 1                 |    |                   |    | 1                 | 3  | 4                 |       |         |
| 2         | 17           | 1                 |    |                   |    | 1                 | 3  | 4                 |       |         |
| 3         | 16           | 1                 |    |                   |    | 1                 | 3  | 4                 |       | 1       |
| 4         | 14           | 2                 |    |                   |    |                   | 2  | 3                 |       | 5       |
| 5         | 12           | 2                 |    |                   |    | 1                 | 3  | 5                 |       | 3       |
| 6         | 14           | 3                 |    |                   |    | 1                 | 2  | 6                 |       |         |
| 7         | 13           | 4                 |    |                   |    | 1                 | 2  | 6                 |       |         |
| 8         | 13           | 4                 |    |                   |    | 1                 | 1  | 7                 |       |         |
| 9         | 13           | 1                 | 1  |                   |    | 1                 | 3  | 7                 |       |         |
| 10        | 12           |                   | 2  |                   |    |                   | 3  | 9                 |       |         |
| 11        | 11           | 1                 | 1  |                   |    | 1                 | 4  | 8                 |       |         |
| Noon.     | 10           | 4                 | 1  |                   |    | 1                 | 3  | 7                 |       |         |
| 1         | 11           | 2                 | 1  |                   |    | 1                 | 4  | 7                 |       |         |
| 2         | 10           | 1                 | 1  |                   | 1  | 1                 | 5  | 7                 |       |         |
| 3         | 10           | 3                 | 2  |                   |    | 2                 | 2  | 7                 |       |         |
| 4         | 11           | 2                 | 1  |                   |    | 2                 | 1  | 8                 |       | 1       |
| 5         | 8            | 2                 | 1  |                   |    |                   | 6  | 9                 |       |         |
| 6         | 5            | 5                 | 2  |                   | 1  | 6                 | 6  | 7                 |       |         |
| 7         | 7            | 4                 | 2  |                   | 1  | 5                 | 5  | 7                 |       |         |
| 8         | 9            | 4                 | 2  |                   | 1  | 5                 | 5  | 5                 |       |         |
| 9         | 9            | 4                 | 2  |                   | 1  | 5                 | 5  | 5                 |       |         |
| 10        | 8            | 3                 | 1  |                   | 1  | 5                 | 5  | 4                 |       | 4       |
| 11        | 8            | 3                 | 2  |                   | 1  | 5                 | 6  | 6                 |       | 1       |



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December, 1860.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Feet.

Height of the Cistern of the Standard Barometer above the Sea level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
ependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | °                             | °                                             | °    | °     |
| 1     | 29.984                                          | 30.058                                    | 29.931  | 0.127   | 70.3                          | 80.4                                          | 63.4 | 17.0  |
| 2     | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 3     | .999                                            | .056                                      | .950    | .106    | 68.7                          | 79.0                                          | 60.8 | 18.2  |
| 4     | .989                                            | .075                                      | .943    | .132    | 68.9                          | 77.0                                          | 60.4 | 16.6  |
| 5     | .991                                            | .069                                      | .937    | .132    | 69.7                          | 78.6                                          | 62.6 | 16.0  |
| 6     | .977                                            | .048                                      | .926    | .122    | 69.6                          | 79.2                                          | 62.1 | 17.1  |
| 7     | .967                                            | .049                                      | .905    | .144    | 70.3                          | 80.0                                          | 63.0 | 17.0  |
| 8     | .994                                            | .090                                      | .947    | .143    | 69.4                          | 79.9                                          | 61.2 | 18.7  |
| 9     | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 10    | 30.016                                          | .092                                      | .964    | .128    | 67.5                          | 77.6                                          | 60.2 | 17.4  |
| 11    | .014                                            | .100                                      | .951    | .149    | 66.2                          | 77.2                                          | 57.0 | 20.2  |
| 12    | 29.993                                          | .072                                      | .932    | .140    | 65.7                          | 77.2                                          | 58.0 | 19.2  |
| 13    | .980                                            | .069                                      | .935    | .134    | 65.5                          | 77.0                                          | 56.6 | 20.4  |
| 14    | .998                                            | .080                                      | .946    | .134    | 66.4                          | 78.6                                          | 58.0 | 20.6  |
| 15    | 30.050                                          | .149                                      | .994    | .155    | 65.8                          | 77.8                                          | 57.2 | 20.6  |
| 16    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 17    | 29.993                                          | .078                                      | .932    | .146    | 65.1                          | 76.6                                          | 56.7 | 19.9  |
| 18    | .984                                            | .072                                      | .925    | .147    | 65.1                          | 76.4                                          | 56.2 | 20.2  |
| 19    | .992                                            | .063                                      | .937    | .126    | 66.3                          | 77.0                                          | 57.6 | 19.4  |
| 20    | 30.007                                          | .083                                      | .937    | .146    | 66.9                          | 77.6                                          | 59.6 | 18.0  |
| 21    | .033                                            | .097                                      | .975    | .122    | 67.1                          | 78.0                                          | 59.9 | 18.1  |
| 22    | .050                                            | .133                                      | .973    | .160    | 63.8                          | 75.4                                          | 55.0 | 20.4  |
| 23    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 24    | .050                                            | .124                                      | 30.009  | .115    | 67.7                          | 78.6                                          | 58.4 | 20.2  |
| 25    | .048                                            | .126                                      | .003    | .123    | 67.8                          | 78.7                                          | 59.0 | 19.7  |
| 26    | .034                                            | .120                                      | 29.974  | .146    | 66.9                          | 77.6                                          | 58.2 | 19.4  |
| 27    | .028                                            | .110                                      | .990    | .120    | 68.5                          | 79.4                                          | 58.8 | 20.6  |
| 28    | .023                                            | .095                                      | .980    | .115    | 67.7                          | 78.8                                          | 58.9 | 19.9  |
| 29    | .044                                            | .119                                      | 30.001  | .118    | 67.8                          | 78.6                                          | 59.8 | 18.8  |
| 30    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 31    | .086                                            | .172                                      | .035    | .137    | 63.6                          | 75.6                                          | 54.0 | 21.6  |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the twenty-four hourly observations made during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December, 1860.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Date. | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a cubic foot of air. | Additional Weight of Va-<br>pour required for com-<br>plete saturation. | Mean degree of Humi-<br>dity, complete satura-<br>tion being unity. |
|-------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|
| 1     | 64.1                            | 6.2                 | 61.0                | 9.3                          | 0.541                            | 5.95                                             | 2.13                                                                    | 0.74                                                                |
| 2     | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 3     | 61.9                            | 6.8                 | 58.5                | 10.2                         | .498                             | .549                                             | .20                                                                     | .71                                                                 |
| 4     | 63.1                            | 5.8                 | 60.2                | 8.7                          | .527                             | .80                                              | 1.94                                                                    | .75                                                                 |
| 5     | 64.5                            | 5.2                 | 61.9                | 7.8                          | .557                             | 6.13                                             | .80                                                                     | .77                                                                 |
| 6     | 64.9                            | 4.7                 | 62.5                | 7.1                          | .568                             | .26                                              | .64                                                                     | .79                                                                 |
| 7     | 64.0                            | 6.3                 | 60.8                | 9.5                          | .537                             | 5.90                                             | 2.18                                                                    | .73                                                                 |
| 8     | 63.4                            | 6.0                 | 60.4                | 9.0                          | .530                             | .84                                              | .02                                                                     | .74                                                                 |
| 9     | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 10    | 60.6                            | 6.9                 | 56.5                | 11.0                         | .465                             | .14                                              | .28                                                                     | .69                                                                 |
| 11    | 59.6                            | 6.6                 | 55.6                | 10.6                         | .452                             | .01                                              | .11                                                                     | .70                                                                 |
| 12    | 59.3                            | 6.4                 | 55.5                | 10.2                         | .450                             | .00                                              | .02                                                                     | .71                                                                 |
| 13    | 58.9                            | 6.6                 | 54.9                | 10.6                         | .441                             | 4.89                                             | .09                                                                     | .70                                                                 |
| 14    | 59.4                            | 7.0                 | 55.2                | 11.2                         | .445                             | .94                                              | .23                                                                     | .69                                                                 |
| 15    | 58.9                            | 6.9                 | 54.8                | 11.0                         | .440                             | .87                                              | .17                                                                     | .69                                                                 |
| 16    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 17    | 58.5                            | 6.6                 | 54.5                | 10.6                         | .435                             | .83                                              | .06                                                                     | .70                                                                 |
| 18    | 59.1                            | 6.0                 | 55.5                | 9.6                          | .450                             | 5.00                                             | 1.89                                                                    | .73                                                                 |
| 19    | 60.0                            | 6.3                 | 56.2                | 10.1                         | .461                             | .11                                              | 2.04                                                                    | .72                                                                 |
| 20    | 60.8                            | 6.1                 | 57.1                | 9.8                          | .475                             | .25                                              | .03                                                                     | .72                                                                 |
| 21    | 59.1                            | 8.0                 | 54.3                | 12.8                         | .432                             | 4.78                                             | .54                                                                     | .65                                                                 |
| 22    | 56.4                            | 7.4                 | 51.2                | 12.6                         | .389                             | .33                                              | .28                                                                     | .66                                                                 |
| 23    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 24    | 62.1                            | 5.6                 | 58.7                | 9.0                          | .501                             | 5.54                                             | 1.92                                                                    | .74                                                                 |
| 25    | 61.7                            | 6.1                 | 58.0                | 9.8                          | .489                             | .40                                              | 2.08                                                                    | .72                                                                 |
| 26    | 61.0                            | 5.9                 | 57.5                | 9.4                          | .481                             | .33                                              | 1.95                                                                    | .73                                                                 |
| 27    | 62.0                            | 6.5                 | 58.7                | 9.8                          | .501                             | .53                                              | 2.12                                                                    | .72                                                                 |
| 28    | 61.1                            | 6.6                 | 57.1                | 10.6                         | .475                             | .24                                              | .22                                                                     | .70                                                                 |
| 29    | 60.2                            | 7.6                 | 55.6                | 12.2                         | .452                             | .00                                              | .48                                                                     | .67                                                                 |
| 30    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 31    | 56.1                            | 7.5                 | 50.8                | 12.8                         | .383                             | 4.28                                             | .29                                                                     | .65                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>for each hour during<br>the month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Temperature<br>for each hour during<br>the month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|----------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                           | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | °                             | °                                                              | °    | °     |
| Mid-<br>night. | 30.006                                          | 30.100                                                       | 29.964  | 0.136   | 62.6                          | 66.4                                                           | 57.8 | 8.6   |
| 1              | .001                                            | .090                                                         | .949    | .141    | 62.0                          | 66.0                                                           | 57.0 | 9.0   |
| 2              | 29.994                                          | .075                                                         | .945    | .130    | 61.3                          | 65.2                                                           | 56.5 | 8.7   |
| 3              | .988                                            | .067                                                         | .938    | .129    | 60.7                          | 64.4                                                           | 56.1 | 8.3   |
| 4              | .984                                            | .051                                                         | .949    | .102    | 60.2                          | 63.8                                                           | 56.8 | 7.0   |
| 5              | .999                                            | .079                                                         | .963    | .116    | 59.7                          | 64.0                                                           | 54.1 | 9.9   |
| 6              | 30.019                                          | .108                                                         | .989    | .119    | 59.2                          | 63.4                                                           | 54.0 | 9.4   |
| 7              | .041                                            | .131                                                         | 30.005  | .126    | 59.3                          | 64.8                                                           | 54.4 | 10.4  |
| 8              | .068                                            | .129                                                         | .029    | .100    | 62.6                          | 66.8                                                           | 58.1 | 8.7   |
| 9              | .090                                            | .172                                                         | .041    | .131    | 65.9                          | 71.4                                                           | 61.4 | 10.0  |
| 10             | .087                                            | .159                                                         | .034    | .125    | 69.8                          | 74.2                                                           | 64.6 | 9.6   |
| 11             | .071                                            | .140                                                         | .021    | .119    | 73.1                          | 77.0                                                           | 68.8 | 8.2   |
| Noon.          | .039                                            | .116                                                         | 29.987  | .129    | 75.6                          | 78.5                                                           | 72.4 | 6.1   |
| 1              | .006                                            | .096                                                         | .952    | .144    | 77.1                          | 80.0                                                           | 74.4 | 5.6   |
| 2              | 29.982                                          | .059                                                         | .924    | .135    | 77.9                          | 80.4                                                           | 75.4 | 5.0   |
| 3              | .967                                            | .043                                                         | .911    | .132    | 77.4                          | 79.4                                                           | 74.8 | 4.6   |
| 4              | .961                                            | .037                                                         | .905    | .132    | 75.2                          | 77.0                                                           | 71.0 | 6.0   |
| 5              | .965                                            | .035                                                         | .919    | .116    | 73.2                          | 75.8                                                           | 70.6 | 5.2   |
| 6              | .974                                            | .056                                                         | .927    | .129    | 70.4                          | 73.0                                                           | 66.8 | 6.2   |
| 7              | .991                                            | .063                                                         | .948    | .115    | 68.2                          | 71.7                                                           | 64.4 | 7.3   |
| 8              | 30.006                                          | .075                                                         | .955    | .120    | 66.6                          | 69.8                                                           | 62.4 | 7.4   |
| 9              | .016                                            | .070                                                         | .962    | .108    | 65.4                          | 69.8                                                           | 60.4 | 9.4   |
| 10             | .019                                            | .076                                                         | .977    | .099    | 64.4                          | 68.4                                                           | 59.8 | 8.6   |
| 11             | .016                                            | .067                                                         | .968    | .099    | 63.5                          | 67.2                                                           | 58.9 | 8.3   |

The Mean Height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December, 1860.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Hour.          | Mean Wet Bulb<br>Thermometer. | Dry Bulb above Wet. | Computed Dew point. | Dry Bulb above Dew<br>point. | Mean Elastic force of<br>Vapour. | Mean Weight of Va-<br>pour in a Cubic foot<br>of Air. | Additional Weight of<br>vapour required for<br>complete saturation. | Mean degree of Hu-<br>midity, complete satu-<br>ration being unity. |
|----------------|-------------------------------|---------------------|---------------------|------------------------------|----------------------------------|-------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|
|                | o                             | o                   | o                   | o                            | Inches.                          | Troy grs.                                             | Troy grs.                                                           |                                                                     |
| Mid-<br>night. | 59.3                          | 3.3                 | 57.0                | 5.6                          | 0.473                            | 5.28                                                  | 1.09                                                                | 0.83                                                                |
| 1              | 58.8                          | 3.2                 | 56.6                | 5.4                          | .467                             | .23                                                   | .02                                                                 | .84                                                                 |
| 2              | 58.3                          | 3.0                 | 55.9                | 5.4                          | .456                             | .11                                                   | .01                                                                 | .84                                                                 |
| 3              | 57.8                          | 2.9                 | 55.5                | 5.2                          | .450                             | .05                                                   | 0.95                                                                | .84                                                                 |
| 4              | 57.5                          | 2.7                 | 55.3                | 4.9                          | .447                             | .02                                                   | .89                                                                 | .85                                                                 |
| 5              | 56.9                          | 2.8                 | 54.7                | 5.0                          | .438                             | 4.92                                                  | .90                                                                 | .85                                                                 |
| 6              | 56.6                          | 2.6                 | 54.5                | 4.7                          | .435                             | .89                                                   | .84                                                                 | .85                                                                 |
| 7              | 56.6                          | 2.7                 | 54.4                | 4.9                          | .434                             | .87                                                   | .87                                                                 | .85                                                                 |
| 8              | 58.3                          | 4.3                 | 55.3                | 7.3                          | .447                             | 5.00                                                  | 1.37                                                                | .79                                                                 |
| 9              | 60.1                          | 5.8                 | 56.6                | 9.3                          | .467                             | .18                                                   | .88                                                                 | .73                                                                 |
| 10             | 61.9                          | 7.9                 | 57.9                | 11.9                         | .488                             | .36                                                   | 2.59                                                                | .67                                                                 |
| 11             | 63.2                          | 9.9                 | 58.2                | 14.9                         | .493                             | .38                                                   | 3.41                                                                | .61                                                                 |
| Noon.          | 63.7                          | 11.9                | 57.7                | 17.9                         | .485                             | .26                                                   | 4.22                                                                | .56                                                                 |
| 1              | 64.2                          | 12.9                | 57.7                | 19.4                         | .485                             | .25                                                   | .67                                                                 | .53                                                                 |
| 2              | 64.6                          | 13.3                | 57.9                | 20.0                         | .488                             | .27                                                   | .89                                                                 | .52                                                                 |
| 3              | 64.0                          | 13.4                | 57.3                | 20.1                         | .478                             | .17                                                   | .84                                                                 | .52                                                                 |
| 4              | 63.3                          | 11.9                | 57.3                | 17.9                         | .478                             | .20                                                   | .17                                                                 | .56                                                                 |
| 5              | 63.5                          | 9.7                 | 58.6                | 14.6                         | .499                             | .45                                                   | 3.37                                                                | .62                                                                 |
| 6              | 63.5                          | 6.9                 | 60.0                | 10.4                         | .523                             | .75                                                   | 2.35                                                                | .71                                                                 |
| 7              | 62.6                          | 5.6                 | 59.2                | 9.0                          | .509                             | .63                                                   | 1.95                                                                | .74                                                                 |
| 8              | 62.1                          | 4.5                 | 59.4                | 7.2                          | .513                             | .68                                                   | .53                                                                 | .79                                                                 |
| 9              | 61.2                          | 4.2                 | 58.7                | 6.7                          | .501                             | .56                                                   | .39                                                                 | .80                                                                 |
| 10             | 60.6                          | 3.8                 | 57.9                | 6.5                          | .488                             | .41                                                   | .33                                                                 | .80                                                                 |
| 11             | 59.9                          | 3.6                 | 57.4                | 6.1                          | .480                             | .35                                                   | .20                                                                 | .82                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December, 1860.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                        |
|-------|-----------------------|---------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------|
|       | o                     | Inches.                         |                                   |                                                                                                   |
| 1     | 138.0                 | ..                              | N. & N. W.                        | Scatd. clouds till 4 P. M. cloudless afterwards.                                                  |
| 2     | <i>Sunday.</i>        |                                 |                                   |                                                                                                   |
| 3     | 135.0                 | ..                              | N. & W.                           | Cloudless.                                                                                        |
| 4     | 121.5                 | ..                              | N.                                | Cloudless till 10 A. M. Scatd. \i afterwards.                                                     |
| 5     | 130.0                 | ..                              | S. W. & S. E. & N.                | Cloudless till 10 A. M. Scatd. clouds till 4 P. M. cloudless afterwards; also foggy after 9 P. M. |
| 6     | 133.0                 | ..                              | E. & N E. & N.                    | Cloudless till 10 A. M. Scatd. clouds afterwards; also foggy between Mid-night & 5 A. M.          |
| 7     | 140.0                 | ..                              | N.                                | Cloudless.                                                                                        |
| 8     | 139.4                 | ..                              | N. W. & N.                        | Cloudless.                                                                                        |
| 9     | <i>Sunday.</i>        |                                 |                                   |                                                                                                   |
| 10    | 134.2                 | ..                              | N. & N. W.                        | Cloudless.                                                                                        |
| 11    | 139.0                 | ..                              | S. W. & N. & W.                   | Cloudless.                                                                                        |
| 12    | 139.0                 | ..                              | S. W. & W.                        | Cloudless.                                                                                        |
| 13    | 135.6                 | ..                              | N. & N. W.                        | Cloudless.                                                                                        |
| 14    | 136.7                 | ..                              | N. & N. W.                        | Cloudless till 5 A. M. Scatd. \i till 10 A. M. cloudless afterwards.                              |
| 15    | 135.0                 | ..                              | N.                                | Cloudless; also foggy after 9 P. M.                                                               |
| 16    | <i>Sunday.</i>        |                                 |                                   |                                                                                                   |
| 17    | 132.0                 | ..                              | N. & N. W.                        | Cloudless.                                                                                        |
| 18    | 133.0                 | ..                              | W. & N. & N. W.                   | Cloudless till 11 A. M. Scatd. \i till 5 P. M. cloudless afterwards.                              |
| 19    | 136.4                 | ..                              | N.                                | Cloudless.                                                                                        |
| 20    | 134.0                 | ..                              | N. & N. E.                        | Cloudless till 6 A. M. Scatd. \i till 4 P. M. cloudless afterwards.                               |
| 21    | 136.0                 | ..                              | N.                                | Cloudless.                                                                                        |
| 22    | 134.0                 | ..                              | N. W. & N.                        | Cloudless till 5 A. M. Scatd. \i & \i till 5 P. M. cloudless afterwards.                          |
| 23    | <i>Sunday.</i>        |                                 |                                   |                                                                                                   |
| 24    | 136.0                 | ..                              | N. & N. E.                        | Cloudless.                                                                                        |
| 25    | 135.0                 | ..                              | N. & S.                           | Cloudless till 6 A. M. Scatd. \i & \i till 6 P. M. cloudless afterwards.                          |
| 26    | 136.0                 | ..                              | N. & W.                           | Cloudless till 2 A. M. Scatd. \i & \i afterwards.                                                 |
| 27    | 136.0                 | ..                              | N. & N. W.                        | Cloudless.                                                                                        |
| 28    | 137.2                 | ..                              | N. W. & N.                        | Cloudless.                                                                                        |
| 29    | 137.0                 | ..                              | N. & S. W.                        | Cloudless.                                                                                        |
| 30    | <i>Sunday.</i>        |                                 |                                   |                                                                                                   |
| 31    | 131.4                 | ..                              | N. & W.                           | Cloudless.                                                                                        |

\i Cirri, \i Cirro strati, \i Cumuli, \i Cumulo strati, \i Nimbi, \i Strati  
\i Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December, 1860.*

## MONTHLY RESULTS.

|                                                               |    |    | Inches |
|---------------------------------------------------------------|----|----|--------|
| Mean height of the Barometer for the month,                   | .. | .. | 30.012 |
| Max. height of the Barometer occurred at 9 A. M. on the 31st, | .. | .. | 30.172 |
| Min. height of the Barometer occurred at 4 P. M. on the 7th,  | .. | .. | 29.905 |
| <i>Extreme range</i> of the Barometer during the month,       | .. | .. | 0.267  |
| Mean of the Daily Max. Pressures,                             | .. | .. | 30.092 |
| Ditto ditto Min. ditto,                                       | .. | .. | 29.959 |
| <i>Mean daily range</i> of the Barometer during the month,    | .. | .. | 0.133  |

|                                                               |    |    | °    |
|---------------------------------------------------------------|----|----|------|
| Mean Dry Bulb Thermometer for the month,                      | .. | .. | 67.2 |
| Max. Temperature occurred at 2 P. M. on the 1st,              | .. | .. | 80.4 |
| Min. Temperature occurred at 6 A. M. on the 31st,             | .. | .. | 54.0 |
| <i>Extreme range</i> of the Temperature during the month,     | .. | .. | 26.4 |
| Mean of the daily Max. Temperature,                           | .. | .. | 78.0 |
| Ditto ditto Min. ditto,                                       | .. | .. | 58.9 |
| <i>Mean daily range</i> of the Temperature during the month,  | .. | .. | 19.1 |
| Mean Wet Bulb Thermometer for the month, ..                   | .. | .. | 60.8 |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, .. | .. | .. | 6.4  |
| Computed Mean Dew-point for the month, ..                     | .. | .. | 57.0 |
| Mean Dry Bulb Thermometer above computed Mean Dew-point,      | .. | .. | 10.2 |

|                                                |    |    | Inches |
|------------------------------------------------|----|----|--------|
| Mean Elastic force of Vapour for the month, .. | .. | .. | 0.473  |

|                                                                         |    |    | Troy grains |
|-------------------------------------------------------------------------|----|----|-------------|
| Mean Weight of Vapour for the month, ..                                 | .. | .. | 5.23        |
| Additional Weight of Vapour required for complete saturation, ..        | .. | .. | 2.12        |
| Mean degree of humidity for the month, complete saturation being unity, | .. | .. | 0.71        |

|                                                        |    |    | Inches     |
|--------------------------------------------------------|----|----|------------|
| Rained No. days, Max. fall of rain during 24 hours, .. | .. | .. | Nil.       |
| Total amount of rain during the month, ..              | .. | .. | Nil.       |
| Prevailing direction of the Wind, ..                   | .. | .. | N. & N. W. |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December, 1860.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind  
blew, together with the number of days on which at the same hour,  
when any particular wind was blowing, it rained.

| Hour.     | N.           | Rain on. | N. E. | Rain on. | E. | Rain on. | S. E. | Rain on. | S. | Rain on. | S. W. | Rain on. | W. | Rain on. | N. W. | Rain on. | Calm. | Rain on. | Missed. |
|-----------|--------------|----------|-------|----------|----|----------|-------|----------|----|----------|-------|----------|----|----------|-------|----------|-------|----------|---------|
|           | No. of days. |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |         |
| Midnight. | 16           |          |       |          | 1  |          |       |          | 1  |          | 1     |          | 2  |          | 2     |          |       |          | 3       |
| 1         | 18           |          |       |          | 1  |          |       |          | 1  |          | 2     |          | 2  |          | 2     |          |       |          |         |
| 2         | 18           |          |       |          | 1  |          |       |          | 1  |          | 2     |          | 2  |          | 2     |          |       |          |         |
| 3         | 16           |          |       |          | 1  |          |       |          | 1  |          | 2     |          | 2  |          | 2     |          |       |          | 2       |
| 4         | 18           |          |       |          | 1  |          |       |          |    |          | 2     |          | 2  |          | 1     |          |       |          | 2       |
| 5         | 17           |          |       |          | 1  |          |       |          |    |          | 2     |          | 2  |          | 2     |          |       |          | 2       |
| 6         | 16           | 1        |       |          | 1  |          |       |          |    |          | 1     |          | 4  |          | 3     |          |       |          |         |
| 7         | 14           | 2        |       |          |    |          |       |          |    |          | 2     |          | 5  |          | 3     |          |       |          |         |
| 8         | 11           | 2        |       |          |    |          |       |          | 1  |          | 1     |          | 4  |          | 5     |          |       |          | 2       |
| 9         | 15           | 2        |       |          |    |          | 2     |          | 1  |          | 1     |          | 1  |          | 4     |          |       |          |         |
| 10        | 15           | 2        |       |          | 2  |          |       |          | 3  |          |       |          | 2  |          | 2     |          |       |          |         |
| 11        | 12           | 1        |       |          | 2  |          | 1     |          | 1  |          | 2     |          | 2  |          | 5     |          |       |          |         |
| Noon.     | 10           | 2        |       |          | 2  |          |       |          |    |          | 1     |          | 3  |          | 8     |          |       |          |         |
| 1         | 11           | 2        |       |          |    |          | 1     |          |    |          | 2     |          | 3  |          | 7     |          |       |          |         |
| 2         | 9            | 2        |       |          |    |          | 1     |          |    |          | 1     |          | 3  |          | 10    |          |       |          |         |
| 3         | 7            | 1        |       |          |    |          | 1     |          |    |          | 1     |          | 3  |          | 13    |          |       |          |         |
| 4         | 8            | 1        |       |          |    |          | 1     |          |    |          |       |          | 3  |          | 12    |          |       |          | 1       |
| 5         | 7            | 2        |       |          | 1  |          | 1     |          |    |          | 2     |          | 2  |          | 11    |          |       |          |         |
| 6         | 11           | 2        |       |          | 1  |          | 1     |          | 1  |          | 2     |          | 2  |          | 6     |          |       |          |         |
| 7         | 12           | 2        |       |          | 1  |          | 1     |          | 1  |          | 2     |          | 2  |          | 5     |          |       |          |         |
| 8         | 13           | 2        |       |          | 1  |          |       |          | 1  |          | 2     |          | 2  |          | 5     |          |       |          |         |
| 9         | 13           | 2        |       |          | 1  |          |       |          | 1  |          | 2     |          | 2  |          | 5     |          |       |          |         |
| 10        | 13           | 2        |       |          | 1  |          |       |          | 1  |          | 1     |          | 2  |          | 5     |          |       |          | 1       |
| 11        | 12           | 2        |       |          | 1  |          |       |          | 1  |          | 2     |          | 1  |          | 5     |          |       |          | 2       |





*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January, 1861.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Feet.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | o                             | o                                             | o    | o     |
| 1     | 30.061                                          | 30.137                                    | 30.000  | 0.137   | 63.0                          | 76.0                                          | 53.6 | 22.4  |
| 2     | .056                                            | .129                                      | 29.987  | .142    | 64.5                          | 77.8                                          | 54.6 | 23.2  |
| 3     | .040                                            | .118                                      | .988    | .130    | 66.5                          | 78.9                                          | 58.0 | 20.9  |
| 4     | .021                                            | .114                                      | .953    | .161    | 66.5                          | 78.6                                          | 56.6 | 22.0  |
| 5     | 29.975                                          | .066                                      | .914    | .152    | 66.8                          | 79.0                                          | 57.6 | 21.4  |
| 6     | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 7     | .934                                            | .008                                      | .877    | .131    | 69.1                          | 79.2                                          | 60.7 | 18.5  |
| 8     | .941                                            | .026                                      | .895    | .131    | 71.1                          | 78.8                                          | 65.3 | 13.5  |
| 9     | .972                                            | .053                                      | .907    | .146    | 71.3                          | 81.8                                          | 65.8 | 16.0  |
| 10    | .970                                            | .045                                      | .904    | .141    | 71.8                          | 80.0                                          | 67.2 | 12.8  |
| 11    | .977                                            | .039                                      | .937    | .102    | 71.4                          | 78.6                                          | 65.8 | 12.8  |
| 12    | 30.029                                          | .114                                      | .961    | .153    | 70.5                          | 77.4                                          | 67.0 | 10.4  |
| 13    | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 14    | .025                                            | .085                                      | .984    | .101    | 70.4                          | 77.8                                          | 65.4 | 12.4  |
| 15    | .078                                            | .157                                      | 30.028  | .129    | 70.3                          | 78.8                                          | 63.6 | 15.2  |
| 16    | .016                                            | .112                                      | 29.920  | .192    | 69.3                          | 79.0                                          | 61.2 | 17.8  |
| 17    | 29.930                                          | .006                                      | .861    | .145    | 69.9                          | 79.8                                          | 63.8 | 16.0  |
| 18    | .925                                            | .025                                      | .862    | .163    | 70.8                          | 81.8                                          | 62.2 | 19.6  |
| 19    | .961                                            | .031                                      | .914    | .117    | 73.4                          | 80.2                                          | 68.8 | 11.4  |
| 20    | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 21    | .946                                            | .015                                      | .898    | .117    | 70.7                          | 77.6                                          | 66.2 | 11.4  |
| 22    | .973                                            | .075                                      | .914    | .161    | 66.6                          | 74.2                                          | 59.2 | 15.0  |
| 23    | .966                                            | .046                                      | .917    | .129    | 62.5                          | 64.8                                          | 60.6 | 4.2   |
| 24    | .992                                            | .065                                      | .936    | .129    | 64.8                          | 75.0                                          | 57.6 | 17.4  |
| 25    | 30.039                                          | .112                                      | 30.002  | .110    | 62.0                          | 73.0                                          | 54.0 | 19.0  |
| 26    | .002                                            | .088                                      | 29.931  | .157    | 62.9                          | 74.8                                          | 52.7 | 22.1  |
| 27    | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 28    | 29.827                                          | 29.911                                    | .736    | .175    | 70.2                          | 83.2                                          | 61.3 | 21.9  |
| 29    | .843                                            | .918                                      | .783    | .135    | 69.1                          | 78.0                                          | 62.2 | 15.8  |
| 30    | .907                                            | .987                                      | .864    | .123    | 65.3                          | 75.6                                          | 58.6 | 17.0  |
| 31    | .962                                            | 30.047                                    | .902    | .145    | 65.3                          | 77.2                                          | 55.2 | 22.0  |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the twenty-four hourly Observations made during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January, 1861.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Date. | Mean Wet Bulb Thermo-<br>meter. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a cubic foot of Air. | Additional Weight of Va-<br>pour required for com-<br>plete saturation. | Mean degree of Humidity,<br>complete saturation be-<br>ing unity. |
|-------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------|
|       | °                               | °                   | °                   | °                            | Inches.                          | T. gr.                                           | T. gr.                                                                  |                                                                   |
| 1     | 55.8                            | 7.2                 | 50.8                | 12.2                         | .0383                            | 4.28                                             | 2.17                                                                    | .066                                                              |
| 2     | 57.3                            | 7.2                 | 53.0                | 11.5                         | .414                             | .60                                              | .16                                                                     | .68                                                               |
| 3     | 58.7                            | 7.8                 | 54.0                | 12.5                         | .428                             | .73                                              | .46                                                                     | .66                                                               |
| 4     | 58.9                            | 7.6                 | 54.3                | 12.2                         | .432                             | .79                                              | .40                                                                     | .67                                                               |
| 5     | 60.1                            | 6.7                 | 56.1                | 10.7                         | .459                             | 5.09                                             | .17                                                                     | .70                                                               |
| 6     | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 7     | 64.0                            | 5.1                 | 61.4                | 7.7                          | .548                             | 6.04                                             | 1.74                                                                    | .78                                                               |
| 8     | 66.9                            | 4.2                 | 64.8                | 6.3                          | .613                             | .75                                              | .53                                                                     | .82                                                               |
| 9     | 66.9                            | 4.4                 | 64.7                | 6.6                          | .611                             | .70                                              | .63                                                                     | .80                                                               |
| 10    | 67.6                            | 4.2                 | 65.5                | 6.3                          | .628                             | .90                                              | .55                                                                     | .82                                                               |
| 11    | 67.5                            | 3.9                 | 65.5                | 5.9                          | .628                             | .90                                              | .45                                                                     | .83                                                               |
| 12    | 65.4                            | 5.1                 | 62.8                | 7.7                          | .574                             | .31                                              | .82                                                                     | .78                                                               |
| 13    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 14    | 63.9                            | 6.5                 | 60.6                | 9.8                          | .534                             | 5.86                                             | 2.24                                                                    | .72                                                               |
| 15    | 63.7                            | 6.6                 | 60.4                | 9.9                          | .530                             | .83                                              | .25                                                                     | .72                                                               |
| 16    | 62.9                            | 6.4                 | 59.7                | 9.6                          | .518                             | .70                                              | .13                                                                     | .73                                                               |
| 17    | 63.2                            | 6.7                 | 59.8                | 10.1                         | .520                             | .71                                              | .27                                                                     | .72                                                               |
| 18    | 65.5                            | 5.3                 | 62.8                | 8.0                          | .574                             | 6.31                                             | 1.89                                                                    | .77                                                               |
| 19    | 68.3                            | 5.1                 | 65.7                | 7.7                          | .632                             | .91                                              | .96                                                                     | .78                                                               |
| 20    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 21    | 66.0                            | 4.7                 | 63.6                | 7.1                          | .590                             | .48                                              | .70                                                                     | .79                                                               |
| 22    | 58.3                            | 8.3                 | 53.3                | 13.3                         | .418                             | 4.64                                             | 2.57                                                                    | .64                                                               |
| 23    | 58.2                            | 4.3                 | 55.2                | 7.3                          | .445                             | .98                                              | 1.37                                                                    | .79                                                               |
| 24    | 58.6                            | 6.2                 | 54.9                | 9.9                          | .441                             | .90                                              | .93                                                                     | .72                                                               |
| 25    | 54.8                            | 7.2                 | 49.8                | 12.2                         | .371                             | .15                                              | 2.10                                                                    | .66                                                               |
| 26    | 55.6                            | 7.3                 | 50.5                | 12.4                         | .380                             | .25                                              | .18                                                                     | .66                                                               |
| 27    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 28    | 63.3                            | 6.9                 | 59.8                | 10.4                         | .520                             | 5.71                                             | .34                                                                     | .71                                                               |
| 29    | 61.2                            | 7.9                 | 57.2                | 11.9                         | .476                             | .24                                              | .54                                                                     | .67                                                               |
| 30    | 57.2                            | 8.1                 | 52.3                | 13.0                         | .404                             | 4.49                                             | .44                                                                     | .65                                                               |
| 31    | 57.2                            | 8.1                 | 52.3                | 13.0                         | .404                             | .49                                              | .44                                                                     | .65                                                               |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January, 1861.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer<br>at 32° Fabt. | Range of the Barometer for<br>each hour during the<br>month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture for each hour<br>during the<br>month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|---------------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                                | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | o                             | o                                                                   | o    | o     |
| Mid-<br>night. | 29.966                                          | 30.078                                                       | 29.813  | 0.265   | 64.3                          | 70.2                                                                | 56.9 | 13.3  |
| 1              | .972                                            | .075                                                         | .800    | .275    | 63.6                          | 69.8                                                                | 55.8 | 14.0  |
| 2              | .965                                            | .065                                                         | .797    | .268    | 63.1                          | 69.4                                                                | 55.0 | 14.4  |
| 3              | .958                                            | .061                                                         | .784    | .277    | 62.8                          | 69.0                                                                | 54.2 | 14.8  |
| 4              | .954                                            | .056                                                         | .783    | .273    | 62.3                          | 69.0                                                                | 53.6 | 15.4  |
| 5              | .961                                            | .071                                                         | .802    | .269    | 61.6                          | 69.4                                                                | 52.9 | 16.5  |
| 6              | .976                                            | .090                                                         | .828    | .262    | 61.4                          | 69.2                                                                | 52.8 | 16.4  |
| 7              | .997                                            | .107                                                         | .841    | .266    | 61.1                          | 68.8                                                                | 52.7 | 16.1  |
| 8              | 30.031                                          | .126                                                         | .872    | .254    | 63.5                          | 69.8                                                                | 55.7 | 14.1  |
| 9              | .051                                            | .157                                                         | .906    | .251    | 66.3                          | 72.5                                                                | 60.2 | 12.3  |
| 10             | .055                                            | .152                                                         | .911    | .241    | 69.2                          | 74.0                                                                | 63.2 | 10.8  |
| 11             | .036                                            | .123                                                         | .897    | .226    | 72.4                          | 76.6                                                                | 63.3 | 13.3  |
| Noon.          | .006                                            | .095                                                         | .862    | .233    | 74.9                          | 80.0                                                                | 64.2 | 15.8  |
| 1              | 29.973                                          | .068                                                         | .832    | .236    | 76.3                          | 81.8                                                                | 63.1 | 18.7  |
| 2              | .949                                            | .049                                                         | .798    | .251    | 77.2                          | 81.8                                                                | 63.0 | 18.8  |
| 3              | .930                                            | .031                                                         | .760    | .271    | 77.3                          | 83.2                                                                | 62.8 | 20.4  |
| 4              | .926                                            | .028                                                         | .747    | .281    | 75.6                          | 81.8                                                                | 62.5 | 19.3  |
| 5              | .923                                            | .035                                                         | .749    | .286    | 74.0                          | 80.6                                                                | 61.8 | 18.8  |
| 6              | .931                                            | .037                                                         | .736    | .301    | 71.3                          | 75.8                                                                | 61.6 | 14.2  |
| 7              | .950                                            | .056                                                         | .760    | .296    | 69.2                          | 74.8                                                                | 61.4 | 13.4  |
| 8              | .966                                            | .074                                                         | .774    | .309    | 67.6                          | 73.8                                                                | 61.0 | 12.8  |
| 9              | .975                                            | .082                                                         | .784    | .298    | 66.6                          | 73.6                                                                | 59.6 | 14.0  |
| 10             | .979                                            | .084                                                         | .822    | .262    | 66.3                          | 72.8                                                                | 60.4 | 12.4  |
| 11             | .975                                            | .071                                                         | .819    | .252    | 65.2                          | 72.4                                                                | 59.8 | 12.6  |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January, 1861.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Hour.          | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force<br>of Vapour. | Mean Weight of Va-<br>pour in a Cubic<br>foot of Air. | Additional Weight of<br>Vapour required<br>for complete satu-<br>ration. | Mean degree of Hu-<br>midity, complete<br>saturation being<br>unity. |
|----------------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------|
|                | o                               | o                   | o                   | o                            | Inches.                          | Troy grs.                                             | Troy grs.                                                                |                                                                      |
| Mid-<br>night. | 61.0                            | 3.3                 | 58.7                | 5.6                          | 0.501                            | 5.57                                                  | 1.15                                                                     | 0.83                                                                 |
| 1              | 60.4                            | 3.2                 | 58.2                | 5.4                          | .493                             | .49                                                   | .08                                                                      | .84                                                                  |
| 2              | 60.1                            | 3.0                 | 58.0                | 5.1                          | .489                             | .45                                                   | .02                                                                      | .84                                                                  |
| 3              | 60.0                            | 2.8                 | 58.0                | 4.8                          | .489                             | .45                                                   | 0.96                                                                     | .85                                                                  |
| 4              | 59.5                            | 2.8                 | 57.5                | 4.8                          | .481                             | .38                                                   | .93                                                                      | .85                                                                  |
| 5              | 58.7                            | 2.9                 | 56.7                | 4.9                          | .469                             | .24                                                   | .93                                                                      | .85                                                                  |
| 6              | 58.7                            | 2.7                 | 56.5                | 4.9                          | .465                             | .21                                                   | .93                                                                      | .85                                                                  |
| 7              | 58.4                            | 2.7                 | 56.2                | 4.9                          | .461                             | .16                                                   | .92                                                                      | .85                                                                  |
| 8              | 59.7                            | 3.8                 | 57.0                | 6.5                          | .473                             | .27                                                   | 1.28                                                                     | .81                                                                  |
| 9              | 60.8                            | 5.5                 | 57.5                | 8.8                          | .481                             | .33                                                   | .82                                                                      | .75                                                                  |
| 10             | 62.0                            | 7.2                 | 58.4                | 10.8                         | .496                             | .46                                                   | 2.35                                                                     | .70                                                                  |
| 11             | 62.9                            | 9.5                 | 58.1                | 14.3                         | .491                             | .38                                                   | 3.22                                                                     | .63                                                                  |
|                |                                 |                     |                     |                              |                                  |                                                       |                                                                          |                                                                      |
| Noon.          | 63.8                            | 11.1                | 58.2                | 16.7                         | .493                             | .36                                                   | .92                                                                      | .58                                                                  |
| 1              | 64.3                            | 12.0                | 58.3                | 18.0                         | .494                             | .36                                                   | 4.33                                                                     | .55                                                                  |
| 2              | 64.4                            | 12.8                | 58.0                | 19.2                         | .489                             | .30                                                   | .65                                                                      | .53                                                                  |
| 3              | 64.3                            | 13.0                | 57.8                | 19.5                         | .486                             | .26                                                   | .72                                                                      | .53                                                                  |
| 4              | 64.1                            | 11.5                | 58.3                | 17.3                         | .494                             | .37                                                   | .11                                                                      | .57                                                                  |
| 5              | 64.1                            | 9.9                 | 59.1                | 14.9                         | .508                             | .54                                                   | 3.50                                                                     | .61                                                                  |
| 6              | 64.4                            | 6.9                 | 60.9                | 10.4                         | .539                             | .92                                                   | 2.41                                                                     | .71                                                                  |
| 7              | 63.5                            | 5.7                 | 60.6                | 8.6                          | .534                             | .87                                                   | 1.94                                                                     | .75                                                                  |
| 8              | 62.7                            | 4.9                 | 59.8                | 7.8                          | .520                             | .74                                                   | .70                                                                      | .77                                                                  |
| 9              | 62.2                            | 4.4                 | 59.6                | 7.0                          | .516                             | .72                                                   | .49                                                                      | .79                                                                  |
| 10             | 62.1                            | 4.2                 | 59.6                | 6.7                          | .516                             | .72                                                   | .43                                                                      | .80                                                                  |
| 11             | 61.5                            | 3.7                 | 59.3                | 5.9                          | .511                             | .67                                                   | .24                                                                      | .82                                                                  |

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January, 1861.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                                                         |
|-------|-----------------------|---------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
|       | o                     | Inches.                         |                                   |                                                                                                                                    |
| 1     | 127.0                 | ...                             | N. W. & W.                        | Cloudless till 9 A. M. Scatd. \i & \i afterwards; also slightly foggy between 8 P. M. & midnight.                                  |
| 2     | 135.0                 | ...                             | N. & N. W. & E.                   | Cloudless till 5 A. M. Scatd. \i & \i till 6 P. M. cloudless afterwards; also foggy between midnight & 3 A. M.; also after 9 P. M. |
| 3     | 136.8                 | ...                             | N. W. & N.                        | Cloudless.                                                                                                                         |
| 4     | 138.0                 | ...                             | W. & N. & N. W.                   | Cloudless.                                                                                                                         |
| 5     | 139.0                 | ...                             | N. & W. & S. W.                   | Cloudless.                                                                                                                         |
| 6     | <i>Sunday.</i>        |                                 |                                   |                                                                                                                                    |
| 7     | 126.6                 | ...                             | S. & E.                           | Cloudless till 5 A. M. Scatd. \i & \i till 6 P. M. cloudless afterwards.                                                           |
| 8     | 137.0                 | ...                             | S. & S. E.                        | Cloudy till 4 A. M. cloudless & foggy till 9 A. M. Scatd. clouds till 6 P. M. Scatd. \i afterwards.                                |
| 9     | 139.0                 | ...                             | S. & S. E.                        | Cloudless till 7 A. M. Scatd. clouds till 6 P. M. cloudless afterwards.                                                            |
| 10    | 126.0                 | 0.56                            | S.                                | Cloudy till 8 P. M. cloudless afterwards; also raining at 6 & 7 A. M. & at 7 P. M.                                                 |
| 11    | 121.0                 | ...                             | S. & N.                           | Cloudless till 1 A. M. cloudy till 8 A. M. Scatd. \i & \i till 7 P. M. cloudless afterwards.                                       |
| 12    | 133.0                 | ...                             | N.                                | Cloudy till 10 A. M. Scatd. \i till 6 P. M. cloudless afterwards.                                                                  |
| 13    | <i>Sunday.</i>        |                                 |                                   |                                                                                                                                    |
| 14    | 135.0                 | ...                             | N. & N. E.                        | Cloudless till 5 A. M. cloudy till 11 A. M. cloudless afterwards.                                                                  |
| 15    | 136.0                 | ...                             | N.                                | Scatd. clouds till 7 A. M. cloudless afterwards.                                                                                   |
| 16    | 133.0                 | ...                             | N. & S. W.                        | Cloudless till 10 A. M. Scatd. \i till 9 P. M. cloudless afterwards.                                                               |
| 17    | 135.8                 | ...                             | W. & N. W.                        | Cloudless.                                                                                                                         |
| 18    | 139.0                 | ...                             | S. & W.                           | Cloudless till 6 A. M. Scatd. clouds afterwards.                                                                                   |
| 19    | 121.0                 | ...                             | W. & S. E. & S. W.                | Cloudy; also drizzling at 10 P. M.                                                                                                 |
| 20    | <i>Sunday.</i>        |                                 |                                   |                                                                                                                                    |
| 21    | 110.5                 | ...                             | W. & S. E.                        | Scatd. clouds till 5 P. M. cloudless afterwards; also drizzling at 5 A. M.                                                         |
| 22    | 135.8                 | ...                             | N. & N. E. & W.                   | Cloudless till 5 A. M. Scatd. \i till 6 P. M. cloudy afterwards.                                                                   |
| 23    | ...                   | ..                              | E.                                | Cloudy & constantly drizzling.                                                                                                     |
| 24    | 138.0                 | ...                             | N. & S.                           | Cloudy till 6 A. M. cloudless afterwards.                                                                                          |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January, 1861.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.            |
|-------|-----------------------|---------------------------------|-----------------------------------|---------------------------------------|
| 25    | 133.0                 | ...                             | N. W. & N.                        | Cloudless.                            |
| 26    | 134.0                 | ...                             | S. E. & E. & W.                   | Cloudless; also foggy before sunrise. |
| 27    | <i>Sunday</i>         | ...                             |                                   |                                       |
| 28    | 139.2                 | ...                             | S. W.                             | Cloudless.                            |
| 29    | 132.6                 | ...                             | W. & S. & N. W.                   | Cloudless.                            |
| 30    | 132.4                 | ...                             | N. & S. W.                        | Cloudless.                            |
| 31    | 137.0                 | ...                             | N. E. & N.                        | Cloudless.                            |

∖i Cirri, ∨i Cirro strati, ∩i Cumuli, ∩i Cumulo strati, ∨i Nimbi, —i Strati, ∨i Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January, 1861.*

MONTHLY RESULTS.

|                                                                |    |    | Inches. |
|----------------------------------------------------------------|----|----|---------|
| Mean height of the Barometer for the month,                    | .. | .. | 29.976  |
| Max. height of the Barometer, occurred at 9 A. M. on the 15th, | .. | .. | 30.157  |
| Min. height of the Barometer, occurred at 6 P. M. on the 28th, | .. | .. | 29.736  |
| <i>Extreme range</i> of the Barometer during the month,        | .. | .. | 0.421   |
| Mean of the Daily Max. Pressures,                              | .. | .. | 30.057  |
| Ditto ditto Min. ditto,                                        | .. | .. | 29.918  |
| <i>Mean daily range</i> of the Barometer during the month,     | .. | .. | 0.139   |

---

|                                                              |    |    | °    |
|--------------------------------------------------------------|----|----|------|
| Mean Dry Bulb Thermometer for the month,                     | .. | .. | 68.1 |
| Max. Temperature occurred at 3 P. M. on the 28th,            | .. | .. | 83.2 |
| Min. Temperature occurred at 7 A. M. on the 26th,            | .. | .. | 52.7 |
| <i>Extreme range</i> of the Temperature during the month,    | .. | .. | 30.5 |
| Mean of the daily Max. Temperature,                          | .. | .. | 77.7 |
| Ditto ditto Min. ditto,                                      | .. | .. | 60.9 |
| <i>Mean daily range</i> of the Temperature during the month, | .. | .. | 16.8 |

---

|                                                            |    |    | °       |
|------------------------------------------------------------|----|----|---------|
| Mean Wet Bulb Thermometer for the month,                   | .. | .. | 61.8    |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, | .. | .. | 6.3     |
| Computed Mean Dew-point for the month,                     | .. | .. | 58.0    |
| Mean Dry Bulb Thermometer above computed Mean Dew-point,   | .. | .. | 10.1    |
|                                                            |    |    | Inches. |
| Mean Elastic force of Vapour for the month,                | .. | .. | 0.489   |

---

|                                                                         |    |    | Troy grains. |
|-------------------------------------------------------------------------|----|----|--------------|
| Mean Weight of Vapour for the month,                                    | .. | .. | 5.40         |
| Additional Weight of Vapour required for complete saturation,           | .. | .. | 2.15         |
| Mean degree of humidity for the month, complete saturation being unity, | .. | .. | 0.72         |

---

|                                                   |    |    | Inches.      |
|---------------------------------------------------|----|----|--------------|
| Rained 4 days, Max. fall of rain during 24 hours, | .. | .. | 0.56         |
| Total amount of rain during the month,            | .. | .. | 0.56         |
| Prevailing direction of the Wind,                 | .. | .. | N. & W. & S. |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January, 1861.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind  
blew, together with the number of days on which at the same hour,  
when any particular wind was blowing, it rained.

| Hour.     | N.           | Rain on.<br>N. E. | Rain on.<br>E. | Rain on.<br>S. E. | Rain on.<br>S. | Rain on.<br>S. W. | Rain on.<br>W. | Rain on.<br>N. W. | Rain on.<br>Calcut. | Rain on. | Missed. |
|-----------|--------------|-------------------|----------------|-------------------|----------------|-------------------|----------------|-------------------|---------------------|----------|---------|
|           | No. of days. |                   |                |                   |                |                   |                |                   |                     |          |         |
| Midnight. | 6            |                   | 1              | 2                 | 7              | 1                 | 4              |                   | 3                   | 3        |         |
| 1         | 7            |                   | 1              | 2                 | 7              | 1                 | 5              | 1                 | 3                   |          |         |
| 2         | 8            |                   | 1              | 3                 | 8              | 1                 | 5              | 1                 |                     |          |         |
| 3         | 8            |                   | 1              | 3                 | 8              |                   | 5              | 1                 |                     |          | 1       |
| 4         | 6            |                   | 1              | 3                 | 6              | 2                 | 5              | 2                 |                     |          | 2       |
| 5         | 6            |                   | 2              | 3                 | 5              | 2                 | 6              | 2                 |                     |          | 1       |
| 6         | 7            |                   | 1              | 4                 | 5              | 1                 | 6              | 2                 |                     |          |         |
| 7         | 8            |                   | 1              | 3                 | 5              | 1                 | 4              | 3                 |                     |          |         |
| 8         | 8            | 1                 | 2              | 1                 | 4              |                   | 3              | 4                 |                     |          |         |
| 9         | 8            | 3                 | 2              | 1                 | 3              |                   | 6              | 2                 |                     |          |         |
| 10        | 5            | 1                 | 4              |                   | 2              |                   | 6              | 4                 |                     |          |         |
| 11        | 6            | 1                 | 3              | 1                 | 4              |                   | 3              | 6                 |                     |          |         |
| Noon.     | 5            | 1                 | 1              | 1                 | 3              | 2                 | 5              | 9                 |                     |          |         |
| 1         | 3            | 1                 | 1              | 1                 | 2              | 4                 | 8              | 8                 |                     |          |         |
| 2         | 2            | 2                 | 1              | 1                 | 2              | 4                 | 10             | 6                 |                     |          |         |
| 3         | 2            | 2                 | 1              | 1                 | 3              | 3                 | 8              | 8                 |                     |          |         |
| 4         | 5            | 2                 | 1              |                   | 1              | 1                 | 9              | 3                 |                     |          | 4       |
| 5         | 5            | 2                 | 3              | 1                 | 2              | 2                 | 8              | 3                 |                     |          | 1       |
| 6         | 5            | 2                 | 4              | 3                 | 3              | 2                 | 4              | 3                 |                     |          | 1       |
| 7         | 8            | 1                 | 5              | 2                 | 3              | 1                 | 3              | 3                 |                     |          |         |
| 8         | 8            | 2                 | 4              | 2                 | 3              | 2                 | 3              | 3                 |                     |          |         |
| 9         | 8            | 2                 | 4              | 2                 | 3              | 2                 | 2              | 4                 |                     |          |         |
| 10        | 6            | 2                 | 3              | 2                 | 4              | 2                 | 1              | 5                 |                     |          | 2       |
| 11        | 5            | 2                 | 4              | 2                 | 4              | 2                 |                | 5                 |                     |          | 3       |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February, 1861.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Feet.

Height of the Cistern of the Standard Barometer above the Sea level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | °                             | °                                             | °    | °     |
| 1     | 29.967                                          | 30.065                                    | 29.905  | 0.160   | 65.4                          | 77.6                                          | 57.0 | 20.6  |
| 2     | .931                                            | .004                                      | .857    | .147    | 64.9                          | 77.0                                          | 54.4 | 22.6  |
| 3     | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 4     | .834                                            | 29.917                                    | .765    | .152    | 69.0                          | 80.4                                          | 59.6 | 20.8  |
| 5     | .742                                            | .827                                      | .668    | .159    | 73.7                          | 85.8                                          | 65.8 | 20.0  |
| 6     | .751                                            | .826                                      | .682    | .144    | 75.2                          | 86.0                                          | 66.2 | 19.8  |
| 7     | .884                                            | .961                                      | .808    | .153    | 71.6                          | 82.6                                          | 61.6 | 21.0  |
| 8     | .917                                            | 30.004                                    | .854    | .150    | 71.2                          | 83.0                                          | 61.2 | 21.8  |
| 9     | .890                                            | 29.981                                    | .828    | .153    | 72.5                          | 83.8                                          | 62.8 | 21.0  |
| 10    | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 11    | .900                                            | .977                                      | .850    | .127    | 71.2                          | 83.4                                          | 61.8 | 21.6  |
| 12    | .912                                            | .994                                      | .859    | .135    | 72.0                          | 83.6                                          | 63.1 | 20.5  |
| 13    | .908                                            | .994                                      | .844    | .150    | 71.3                          | 83.2                                          | 62.6 | 20.6  |
| 14    | .878                                            | .960                                      | .814    | .146    | 73.4                          | 85.6                                          | 63.8 | 21.8  |
| 15    | .808                                            | .884                                      | .724    | .160    | 75.0                          | 88.5                                          | 64.4 | 24.1  |
| 16    | .871                                            | .965                                      | .800    | .165    | 73.3                          | 82.6                                          | 64.7 | 17.9  |
| 17    | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 18    | 30.035                                          | 30.125                                    | .977    | .148    | 71.6                          | 85.2                                          | 60.4 | 24.8  |
| 19    | .065                                            | .155                                      | 30.017  | .138    | 72.8                          | 85.3                                          | 63.0 | 22.3  |
| 20    | .042                                            | .146                                      | 29.968  | .178    | 72.9                          | 84.0                                          | 62.3 | 21.7  |
| 21    | .011                                            | .096                                      | .949    | .147    | 72.4                          | 84.2                                          | 62.0 | 22.2  |
| 22    | .016                                            | .100                                      | .964    | .136    | 72.8                          | 84.8                                          | 64.8 | 20.0  |
| 23    | 29.989                                          | .093                                      | .914    | .179    | 70.6                          | 84.4                                          | 59.2 | 25.2  |
| 24    | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 25    | .886                                            | 29.957                                    | .797    | .160    | 76.2                          | 89.6                                          | 66.6 | 23.0  |
| 26    | .897                                            | .973                                      | .842    | .131    | 77.9                          | 89.8                                          | 70.8 | 19.0  |
| 27    | .925                                            | 30.017                                    | .858    | .159    | 77.2                          | 88.9                                          | 66.6 | 22.3  |
| 28    | .873                                            | 29.953                                    | .802    | .151    | 78.9                          | 90.6                                          | 72.0 | 18.6  |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the twenty-four hourly observations made during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February, 1861.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Date. | Mean Wet Bulb Ther-<br>moneter. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a Cubic foot of air. | Additional Weight of Va-<br>pour required for com-<br>plete saturation. | Mean degree of Humi-<br>dity, complete satura-<br>tion being unity. |
|-------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|
| 1     | 57.7                            | 7.7                 | 53.1                | 12.3                         | .415                             | 4.62                                             | 2.33                                                                    | .67                                                                 |
| 2     | 57.0                            | 7.9                 | 52.3                | 12.6                         | .404                             | .49                                              | .36                                                                     | .66                                                                 |
| 3     | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 4     | 61.4                            | 7.6                 | 57.6                | 11.4                         | .483                             | 5.32                                             | .44                                                                     | .69                                                                 |
| 5     | 67.8                            | 5.9                 | 64.8                | 8.9                          | .613                             | 6.71                                             | .25                                                                     | .75                                                                 |
| 6     | 67.2                            | 8.0                 | 63.2                | 12.0                         | .582                             | .33                                              | 3.04                                                                    | .68                                                                 |
| 7     | 62.2                            | 9.4                 | 57.5                | 14.1                         | .481                             | 5.28                                             | .12                                                                     | .63                                                                 |
| 8     | 62.0                            | 9.2                 | 57.4                | 13.8                         | .480                             | .26                                              | .04                                                                     | .63                                                                 |
| 9     | 62.0                            | 10.5                | 56.7                | 15.8                         | .469                             | .12                                              | .51                                                                     | .59                                                                 |
| 10    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 11    | 61.4                            | 9.8                 | 56.5                | 14.7                         | .465                             | .10                                              | .20                                                                     | .61                                                                 |
| 12    | 62.7                            | 9.3                 | 58.0                | 14.0                         | .489                             | .36                                              | .14                                                                     | .63                                                                 |
| 13    | 62.2                            | 9.1                 | 57.6                | 13.7                         | .483                             | .29                                              | .04                                                                     | .64                                                                 |
| 14    | 62.7                            | 10.7                | 57.3                | 16.1                         | .478                             | .22                                              | .65                                                                     | .59                                                                 |
| 15    | 66.6                            | 8.4                 | 62.4                | 12.6                         | .567                             | 6.17                                             | .14                                                                     | .66                                                                 |
| 16    | 60.4                            | 12.9                | 53.9                | 19.4                         | .426                             | 4.67                                             | 4.17                                                                    | .53                                                                 |
| 17    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 18    | 60.1                            | 11.5                | 54.3                | 17.3                         | .432                             | .74                                              | 3.66                                                                    | .56                                                                 |
| 19    | 62.9                            | 9.9                 | 57.9                | 14.9                         | .488                             | 5.33                                             | .38                                                                     | .61                                                                 |
| 20    | 62.8                            | 10.1                | 57.7                | 15.2                         | .485                             | .30                                              | .43                                                                     | .61                                                                 |
| 21    | 64.4                            | 8.0                 | 60.4                | 12.0                         | .530                             | .81                                              | 2.79                                                                    | .68                                                                 |
| 22    | 62.9                            | 9.9                 | 57.9                | 14.9                         | .488                             | .33                                              | 3.38                                                                    | .61                                                                 |
| 23    | 60.0                            | 10.6                | 54.7                | 15.9                         | .438                             | 4.81                                             | .34                                                                     | .59                                                                 |
| 24    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 25    | 67.0                            | 9.2                 | 62.4                | 13.8                         | .567                             | 6.15                                             | .51                                                                     | .64                                                                 |
| 26    | 68.7                            | 9.2                 | 64.1                | 13.8                         | .599                             | .48                                              | .68                                                                     | .64                                                                 |
| 27    | 67.7                            | 9.5                 | 62.9                | 14.3                         | .576                             | .25                                              | .70                                                                     | .63                                                                 |
| 28    | 70.9                            | 8.0                 | 66.9                | 12.0                         | .657                             | 7.11                                             | .36                                                                     | .68                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February, 1861.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>for each hour during<br>the month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Temperature<br>for each hour during<br>the month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|----------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                           | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | °                             | °                                                              | °    | °     |
| Mid-<br>night. | 29.917                                          | 30.070                                                       | 29.710  | 0.360   | 67.3                          | 73.4                                                           | 59.0 | 14.4  |
| 1              | .909                                            | .060                                                         | .707    | .353    | 66.5                          | 73.0                                                           | 58.6 | 14.4  |
| 2              | .902                                            | .057                                                         | .695    | .362    | 65.8                          | 72.8                                                           | 57.8 | 15.0  |
| 3              | .887                                            | .035                                                         | .682    | .353    | 65.3                          | 72.6                                                           | 57.3 | 15.3  |
| 4              | .900                                            | .036                                                         | .732    | .304    | 64.7                          | 72.2                                                           | 57.0 | 15.2  |
| 5              | .901                                            | .040                                                         | .710    | .330    | 64.3                          | 72.2                                                           | 55.2 | 17.0  |
| 6              | .916                                            | .058                                                         | .728    | .330    | 63.7                          | 72.0                                                           | 55.2 | 16.8  |
| 7              | .937                                            | .086                                                         | .754    | .332    | 63.3                          | 72.4                                                           | 54.4 | 18.0  |
| 8              | .963                                            | .114                                                         | .792    | .322    | 65.9                          | 72.9                                                           | 58.4 | 14.5  |
| 9              | .991                                            | .136                                                         | .801    | .335    | 70.7                          | 75.2                                                           | 63.6 | 11.6  |
| 10             | .998                                            | .155                                                         | .824    | .331    | 74.5                          | 79.0                                                           | 68.0 | 11.0  |
| 11             | .987                                            | .137                                                         | .812    | .325    | 78.1                          | 82.8                                                           | 71.4 | 11.4  |
| Noon.          | .959                                            | .109                                                         | .775    | .334    | 81.0                          | 86.6                                                           | 73.7 | 12.9  |
| 1              | .922                                            | .074                                                         | .741    | .333    | 83.0                          | 88.6                                                           | 75.4 | 13.2  |
| 2              | .890                                            | .040                                                         | .716    | .324    | 84.1                          | 89.8                                                           | 77.0 | 12.8  |
| 3              | .869                                            | .022                                                         | .686    | .336    | 84.5                          | 90.2                                                           | 76.8 | 13.4  |
| 4              | .857                                            | .018                                                         | .668    | .350    | 83.5                          | 90.6                                                           | 75.0 | 15.6  |
| 5              | .856                                            | .017                                                         | .675    | .342    | 81.6                          | 89.0                                                           | 73.3 | 15.7  |
| 6              | .863                                            | .025                                                         | .681    | .344    | 77.5                          | 84.0                                                           | 69.3 | 14.7  |
| 7              | .877                                            | .037                                                         | .697    | .340    | 74.4                          | 81.0                                                           | 66.4 | 14.6  |
| 8              | .895                                            | .050                                                         | .708    | .342    | 72.1                          | 79.0                                                           | 64.7 | 14.3  |
| 9              | .912                                            | .084                                                         | .711    | .373    | 70.6                          | 77.2                                                           | 63.3 | 13.9  |
| 10             | .918                                            | .082                                                         | .716    | .366    | 69.5                          | 75.6                                                           | 61.6 | 14.0  |
| 11             | .919                                            | .081                                                         | .714    | .367    | 68.8                          | 74.6                                                           | 61.0 | 13.6  |

The Mean Height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February, 1861.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Hour.          | Mean Wet Bulb<br>Thermometer. | Dry Bulb above Wet. | Computed Dew point. | Dry Bulb above Dew<br>point. | Mean Elastic force of<br>Vapour. | Mean Weight of Va-<br>pour in a Cubic foot<br>of Air. | Additional Weight of<br>vapour required for<br>complete saturation. | Mean degree of Hu-<br>midity, complete satu-<br>ration being unity. |
|----------------|-------------------------------|---------------------|---------------------|------------------------------|----------------------------------|-------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|
|                | o                             | o                   | o                   | o                            | Inches.                          | Troy grs.                                             | Troy grs.                                                           |                                                                     |
| Mid-<br>night. | 63.3                          | 4.0                 | 60.9                | 6.4                          | .0539                            | 5.97                                                  | 1.40                                                                | 0.81                                                                |
| 1              | 62.7                          | 3.8                 | 60.4                | 6.1                          | .530                             | .88                                                   | .31                                                                 | .82                                                                 |
| 2              | 62.3                          | 3.5                 | 60.2                | 5.6                          | .527                             | .84                                                   | .20                                                                 | .83                                                                 |
| 3              | 62.1                          | 3.2                 | 60.2                | 5.1                          | .527                             | .85                                                   | .08                                                                 | .84                                                                 |
| 4              | 61.4                          | 3.3                 | 59.4                | 5.3                          | .513                             | .70                                                   | .10                                                                 | .84                                                                 |
| 5              | 61.1                          | 3.2                 | 58.9                | 5.4                          | .504                             | .61                                                   | .11                                                                 | .84                                                                 |
| 6              | 60.6                          | 3.1                 | 58.4                | 5.3                          | .496                             | .52                                                   | .07                                                                 | .84                                                                 |
| 7              | 60.3                          | 3.0                 | 58.2                | 5.1                          | .493                             | .49                                                   | .02                                                                 | .84                                                                 |
| 8              | 61.4                          | 4.5                 | 58.7                | 7.2                          | .501                             | .56                                                   | .50                                                                 | .79                                                                 |
| 9              | 63.3                          | 7.4                 | 59.6                | 11.1                         | .516                             | .67                                                   | 2.51                                                                | .69                                                                 |
| 10             | 63.9                          | 10.6                | 58.6                | 15.9                         | .499                             | .44                                                   | 3.74                                                                | .59                                                                 |
| 11             | 64.0                          | 14.1                | 56.9                | 21.2                         | .472                             | .10                                                   | 5.12                                                                | .50                                                                 |
| Noon.          | 64.1                          | 16.9                | 55.6                | 25.4                         | .452                             | 4.87                                                  | 6.27                                                                | .44                                                                 |
| 1              | 64.5                          | 18.5                | 55.2                | 27.8                         | .445                             | .77                                                   | 7.05                                                                | .40                                                                 |
| 2              | 64.7                          | 19.4                | 55.0                | 29.1                         | .442                             | .73                                                   | .48                                                                 | .39                                                                 |
| 3              | 64.8                          | 19.7                | 54.9                | 29.6                         | .441                             | .71                                                   | .61                                                                 | .38                                                                 |
| 4              | 64.6                          | 19.9                | 53.6                | 29.9                         | .422                             | .52                                                   | .48                                                                 | .38                                                                 |
| 5              | 65.0                          | 16.6                | 56.7                | 24.9                         | .469                             | 5.03                                                  | 6.31                                                                | .44                                                                 |
| 6              | 66.4                          | 11.1                | 60.8                | 16.7                         | .537                             | .82                                                   | 4.22                                                                | .53                                                                 |
| 7              | 65.2                          | 9.2                 | 60.6                | 13.8                         | .534                             | .81                                                   | 3.34                                                                | .64                                                                 |
| 8              | 64.1                          | 8.0                 | 60.1                | 12.0                         | .525                             | .75                                                   | 2.78                                                                | .67                                                                 |
| 9              | 63.4                          | 7.2                 | 59.8                | 10.8                         | .520                             | .70                                                   | .45                                                                 | .70                                                                 |
| 10             | 63.4                          | 6.1                 | 60.3                | 9.2                          | .528                             | .82                                                   | .06                                                                 | .74                                                                 |
| 11             | 63.9                          | 4.9                 | 61.4                | 7.4                          | .548                             | 6.05                                                  | 1.66                                                                | .79                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February, 1861.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar<br>radiation. | Rain Gauge<br>5 feet above<br>Ground. | Prevailing direction<br>of the Wind. | General Aspect of the Sky.                   |
|-------|--------------------------|---------------------------------------|--------------------------------------|----------------------------------------------|
|       | o                        | Inches.                               |                                      |                                              |
| 1     | 134.9                    | ..                                    | N. E. & S. W. & W.                   | Cloudless.                                   |
| 2     | 134.0                    | ..                                    | W.                                   | Cloudless.                                   |
| 3     | <i>Sunday.</i>           |                                       |                                      |                                              |
| 4     | 136.7                    | ..                                    | N. & S. & S. W.                      | Cloudless.                                   |
| 5     | 141.0                    | ..                                    | S. & S. W.                           | Cloudless; also foggy between 3 & 7<br>A. M. |
| 6     | 145.0                    | ..                                    | S. & W.                              | Cloudless; also foggy between 2 & 7<br>A. M. |
| 7     | 139.0                    | ..                                    | N. W. & W.                           | Cloudless.                                   |
| 8     | 141.0                    | ..                                    | N. E. & N. W.                        | Cloudless.                                   |
| 9     | 137.0                    | ..                                    | W. & S. W. & N. W.                   | Cloudless.                                   |
| 10    | <i>Sunday.</i>           |                                       |                                      |                                              |
| 11    | 137.0                    | ..                                    | N. W. & S                            | Cloudless.                                   |
| 12    | 137.4                    | ..                                    | S. & S. W. & W.                      | Cloudless.                                   |
| 13    | 138.0                    | ..                                    | W. & S. & N. W.                      | Cloudless.                                   |
| 14    | 143.0                    | ..                                    | W.                                   | Cloudless.                                   |
| 15    | 140.0                    | ..                                    | S. W. & W.                           | Cloudless.                                   |
| 16    | 136.0                    | ..                                    | N. & W.                              | Cloudless.                                   |
| 17    | <i>Sunday.</i>           |                                       |                                      |                                              |
| 18    | 139.0                    | ..                                    | N. & N. W. & E.                      | Cloudless.                                   |
| 19    | 138.0                    | ..                                    | N. & S. & S. E.                      | Cloudless.                                   |
| 20    | 135.0                    | ..                                    | E. & N.                              | Cloudless.                                   |
| 21    | 137.2                    | ..                                    | S. & S. W.                           | Cloudless.                                   |
| 22    | 136.8                    | ..                                    | S. & N. E.                           | Cloudless.                                   |
| 23    | 136.8                    | ..                                    | W. & N. & N. W.                      | Cloudless.                                   |
| 24    | <i>Sunday.</i>           |                                       |                                      |                                              |
| 25    | 141.0                    | ..                                    | S. W. & S. & W.                      | Cloudless.                                   |
| 26    | 139.0                    | ..                                    | N. & S. W.                           | Cloudless.                                   |
| 27    | 139.0                    | ..                                    | S. & S. W.                           | Cloudless.                                   |
| 28    | 137.4                    | ..                                    | S. & W.                              | Cloudless; also foggy between 3 & 7<br>A. M. |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February, 1861.*

## MONTHLY RESULTS.

|                                                                |    |    | Inches |
|----------------------------------------------------------------|----|----|--------|
| Mean height of the Barometer for the month,                    | .. | .. | 29.914 |
| Max. height of the Barometer occurred at 10 A. M. on the 19th, | .. | .. | 30.155 |
| Min. height of the Barometer occurred at 4 P. M. on the 5th,   | .. | .. | 29.663 |
| <i>Extreme range</i> of the Barometer during the month,        | .. | .. | 0.487  |
| Mean of the Daily Max. Pressures,                              | .. | .. | 29.999 |
| Ditto ditto Min. ditto,                                        | .. | .. | 29.848 |
| <i>Mean daily range</i> of the Barometer during the month,     | .. | .. | 0.151  |

---

|                                                              |    |    | °    |
|--------------------------------------------------------------|----|----|------|
| Mean Dry Bulb Thermometer for the month,                     | .. | .. | 72.6 |
| Max. Temperature occurred at 4 P. M. on the 28th,            | .. | .. | 90.6 |
| Min. Temperature occurred at 7 A. M. on the 2nd,             | .. | .. | 54.4 |
| <i>Extreme range</i> of the Temperature during the month,    | .. | .. | 36.2 |
| Mean of the daily Max. Temperature,                          | .. | .. | 84.6 |
| Ditto ditto Min. ditto,                                      | .. | .. | 63.2 |
| <i>Mean daily range</i> of the Temperature during the month, | .. | .. | 21.4 |
| Mean Wet Bulb Thermometer for the month,                     | .. | .. | 63.4 |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer,   | .. | .. | 9.2  |
| Computed Mean Dew-point for the month,                       | .. | .. | 58.8 |
| Mean Dry Bulb Thermometer above computed Mean Dew-point,     | .. | .. | 13.8 |

---

|                                             |    |    | Inches |
|---------------------------------------------|----|----|--------|
| Mean Elastic force of Vapour for the month, | .. | .. | 0.503  |

---

|                                                                         |    |    | Troy grains |
|-------------------------------------------------------------------------|----|----|-------------|
| Mean Weight of Vapour for the month,                                    | .. | .. | 5.49        |
| Additional Weight of Vapour required for complete saturation,           | .. | .. | 3.17        |
| Mean degree of humidity for the month, complete saturation being unity, | .. | .. | 0.63        |

---

|                                                     |    |    | Inches          |
|-----------------------------------------------------|----|----|-----------------|
| Rained No. days, Max. fall of rain during 24 hours, | .. | .. | Nil.            |
| Total amount of rain during the month,              | .. | .. | Nil.            |
| Prevailing direction of the Wind,                   | .. | .. | W. & S. & S. W. |



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February, 1861.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind  
blew, together with the number of days on which at the same hour,  
when any particular wind was blowing, it rained.

| Hour. | N. | Rain on. | N. E. | Rain on. | E. | Rain on. | S. E. | Rain on. | S. | Rain on. | S. W. | Rain on. | W. | Rain on. | N. W. | Rain on. | Calm. | Rain on. | Missed |
|-------|----|----------|-------|----------|----|----------|-------|----------|----|----------|-------|----------|----|----------|-------|----------|-------|----------|--------|
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       |          |    |          |       |          |       |          |        |
|       |    |          |       |          |    |          |       |          |    |          |       | </       |    |          |       |          |       |          |        |



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March, 1861.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Feet.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | °                             | °                                             | °    | °     |
| 1     | 29.875                                          | 29.948                                    | 29.821  | 0.127   | 79.8                          | 93.2                                          | 68.6 | 24.6  |
| 2     | .863                                            | .936                                      | .815    | .121    | 81.9                          | 95.6                                          | 72.8 | 22.8  |
| 3     | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 4     | .780                                            | .847                                      | .713    | .134    | 83.1                          | 95.2                                          | 76.2 | 19.0  |
| 5     | .819                                            | .882                                      | .768    | .114    | 80.7                          | 89.6                                          | 74.3 | 15.3  |
| 6     | .822                                            | .888                                      | .754    | .134    | 80.4                          | 89.5                                          | 73.8 | 15.7  |
| 7     | .887                                            | .974                                      | .835    | .139    | 77.3                          | 86.2                                          | 68.3 | 17.9  |
| 8     | .913                                            | 30.004                                    | .862    | .142    | 77.2                          | 88.7                                          | 67.8 | 20.9  |
| 9     | .905                                            | 29.988                                    | .840    | .148    | 78.9                          | 88.8                                          | 71.2 | 17.6  |
| 10    | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 11    | .951                                            | 30.027                                    | .885    | .142    | 78.4                          | 90.2                                          | 71.6 | 18.6  |
| 12    | .991                                            | .090                                      | .933    | .157    | 75.8                          | 83.6                                          | 69.6 | 14.0  |
| 13    | .955                                            | .054                                      | .877    | .177    | 78.1                          | 89.0                                          | 68.6 | 20.4  |
| 14    | .877                                            | 29.958                                    | .786    | .172    | 80.2                          | 91.2                                          | 69.2 | 22.0  |
| 15    | .799                                            | .868                                      | .725    | .143    | 81.5                          | 93.0                                          | 72.2 | 20.8  |
| 16    | .817                                            | .882                                      | .770    | .112    | 82.9                          | 93.4                                          | 73.2 | 20.2  |
| 17    | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 18    | .870                                            | .948                                      | .803    | .145    | 82.8                          | 93.4                                          | 74.4 | 19.0  |
| 19    | .833                                            | .913                                      | .776    | .137    | 81.5                          | 92.6                                          | 73.7 | 18.9  |
| 20    | .871                                            | .981                                      | .792    | .189    | 74.0                          | 77.2                                          | 71.4 | 5.8   |
| 21    | .842                                            | .929                                      | .776    | .153    | 78.7                          | 89.6                                          | 69.8 | 19.8  |
| 22    | .814                                            | .887                                      | .755    | .132    | 79.0                          | 83.6                                          | 75.2 | 8.4   |
| 23    | .770                                            | .843                                      | .662    | .181    | 81.5                          | 90.2                                          | 74.4 | 15.8  |
| 24    | Sunday.                                         |                                           |         |         |                               |                                               |      |       |
| 25    | .781                                            | .856                                      | .722    | .134    | 82.5                          | 94.2                                          | 75.4 | 18.8  |
| 26    | .820                                            | .924                                      | .758    | .166    | 84.0                          | 95.0                                          | 76.4 | 18.6  |
| 27    | .825                                            | .908                                      | .735    | .173    | 85.1                          | 96.2                                          | 76.4 | 19.8  |
| 28    | .818                                            | .892                                      | .761    | .131    | 84.5                          | 96.2                                          | 76.2 | 20.0  |
| 29    | .826                                            | .905                                      | .741    | .164    | 85.0                          | 97.2                                          | 76.6 | 20.6  |
| 30    | .842                                            | .926                                      | .765    | .161    | 85.8                          | 97.8                                          | 76.4 | 21.4  |
| 31    | Sunday.                                         |                                           |         |         |                               |                                               |      |       |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the twenty-four hourly Observations made during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March, 1861.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Date. | Mean Wet Bulb Thermo-<br>meter. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a cubic foot of Air. | Additional Weight of Va-<br>pour required for com-<br>plete saturation. | Mean degree of Humidity,<br>complete saturation be-<br>ing unity. |
|-------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------|
|       | °                               | °                   | °                   | °                            | Inches.                          | T. gr.                                           | T. gr.                                                                  |                                                                   |
| 1     | 69.6                            | 10.2                | 64.5                | 15.3                         | .0607                            | 6.56                                             | 4.19                                                                    | 0.61                                                              |
| 2     | 72.8                            | 9.1                 | 68.2                | 13.7                         | .686                             | 7.37                                             | .07                                                                     | .64                                                               |
| 3     | Sunday.                         |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 4     | 75.0                            | 8.1                 | 70.9                | 12.2                         | .748                             | 8.03                                             | 3.83                                                                    | .68                                                               |
| 5     | 74.8                            | 5.9                 | 71.8                | 8.9                          | .771                             | .30                                              | 2.74                                                                    | .75                                                               |
| 6     | 71.9                            | 5.5                 | 72.1                | 8.3                          | .778                             | .39                                              | .55                                                                     | .77                                                               |
| 7     | 64.9                            | 12.4                | 58.7                | 18.6                         | .501                             | 5.43                                             | 4.55                                                                    | .54                                                               |
| 8     | 65.7                            | 11.5                | 59.9                | 17.3                         | .521                             | .65                                              | .30                                                                     | .57                                                               |
| 9     | 70.7                            | 8.2                 | 66.6                | 12.3                         | .651                             | 7.04                                             | 3.43                                                                    | .67                                                               |
| 10    | Sunday.                         |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 11    | 72.1                            | 6.3                 | 68.9                | 9.5                          | .701                             | .59                                              | 2.72                                                                    | .74                                                               |
| 12    | 69.3                            | 6.5                 | 66.0                | 9.8                          | .638                             | 6.94                                             | .60                                                                     | .73                                                               |
| 13    | 69.6                            | 8.5                 | 65.3                | 12.8                         | .623                             | .75                                              | 3.47                                                                    | .66                                                               |
| 14    | 70.3                            | 9.9                 | 65.3                | 14.9                         | .623                             | .72                                              | 4.16                                                                    | .62                                                               |
| 15    | 72.7                            | 8.8                 | 68.3                | 13.2                         | .688                             | 7.40                                             | 3.91                                                                    | .65                                                               |
| 16    | 74.6                            | 8.3                 | 70.4                | 12.5                         | .736                             | .89                                              | .90                                                                     | .67                                                               |
| 17    | Sunday.                         |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 18    | 74.6                            | 8.2                 | 70.5                | 12.3                         | .739                             | .93                                              | .82                                                                     | .68                                                               |
| 19    | 71.6                            | 9.9                 | 66.6                | 14.9                         | .651                             | 6.99                                             | 4.32                                                                    | .62                                                               |
| 20    | 69.4                            | 4.6                 | 67.1                | 6.9                          | .661                             | 7.22                                             | 1.82                                                                    | .80                                                               |
| 21    | 71.2                            | 7.5                 | 67.4                | 11.3                         | .668                             | .23                                              | 3.18                                                                    | .70                                                               |
| 22    | 75.0                            | 4.0                 | 73.0                | 6.0                          | .801                             | 8.65                                             | 1.85                                                                    | .82                                                               |
| 23    | 74.3                            | 7.2                 | 70.7                | 10.8                         | .744                             | .00                                              | 3.31                                                                    | .71                                                               |
| 24    | Sunday.                         |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |
| 25    | 75.0                            | 7.5                 | 71.2                | 11.3                         | .756                             | .12                                              | .52                                                                     | .70                                                               |
| 26    | 76.1                            | 7.9                 | 72.1                | 11.9                         | .778                             | .33                                              | .84                                                                     | .68                                                               |
| 27    | 75.7                            | 9.4                 | 71.0                | 14.1                         | .751                             | .02                                              | 4.55                                                                    | .64                                                               |
| 28    | 76.0                            | 8.5                 | 71.7                | 12.8                         | .768                             | .21                                              | .14                                                                     | .67                                                               |
| 29    | 77.5                            | 7.5                 | 73.7                | 11.3                         | .819                             | .76                                              | 3.77                                                                    | .70                                                               |
| 30    | 77.5                            | 8.3                 | 73.3                | 12.5                         | .809                             | .61                                              | 4.22                                                                    | .67                                                               |
| 31    | Sunday.                         |                     |                     |                              |                                  |                                                  |                                                                         |                                                                   |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March, 1861.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer for<br>each hour during the<br>month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture for each hour<br>during the<br>month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|---------------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                                | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | o                             | o                                                                   | o    | o     |
| Mid-<br>night. | 29.854                                          | 29.987                                                       | 29.767  | 0.220   | 76.2                          | 80.2                                                                | 70.6 | 9.6   |
| 1              | .840                                            | .979                                                         | .758    | .221    | 75.7                          | 79.8                                                                | 70.8 | 9.0   |
| 2              | .831                                            | .969                                                         | .750    | .219    | 75.2                          | 79.2                                                                | 70.0 | 9.2   |
| 3              | .820                                            | .928                                                         | .737    | .191    | 74.5                          | 78.4                                                                | 69.6 | 8.8   |
| 4              | .822                                            | .952                                                         | .734    | .218    | 73.7                          | 77.2                                                                | 69.4 | 7.8   |
| 5              | .835                                            | .969                                                         | .748    | .221    | 73.7                          | 77.4                                                                | 68.0 | 9.4   |
| 6              | .854                                            | .983                                                         | .751    | .232    | 73.1                          | 76.6                                                                | 67.8 | 8.8   |
| 7              | .874                                            | 30.000                                                       | .781    | .219    | 73.4                          | 77.6                                                                | 67.8 | 9.8   |
| 8              | .912                                            | .069                                                         | .828    | .241    | 76.8                          | 80.8                                                                | 70.2 | 10.6  |
| 9              | .928                                            | .074                                                         | .842    | .232    | 79.9                          | 84.4                                                                | 71.6 | 12.8  |
| 10             | .932                                            | .090                                                         | .841    | .249    | 82.7                          | 88.6                                                                | 71.4 | 17.2  |
| 11             | .921                                            | .080                                                         | .824    | .256    | 85.5                          | 91.4                                                                | 72.2 | 19.2  |
| Noon.          | .896                                            | .049                                                         | .796    | .253    | 87.8                          | 94.2                                                                | 72.2 | 22.0  |
| 1              | .866                                            | .022                                                         | .764    | .258    | 89.6                          | 95.6                                                                | 73.0 | 22.6  |
| 2              | .834                                            | 29.984                                                       | .725    | .259    | 90.4                          | 97.0                                                                | 73.6 | 23.4  |
| 3              | .810                                            | .951                                                         | .697    | .254    | 90.3                          | 97.4                                                                | 75.6 | 21.8  |
| 4              | .797                                            | .945                                                         | .672    | .273    | 89.6                          | 97.8                                                                | 75.6 | 22.2  |
| 5              | .793                                            | .940                                                         | .662    | .278    | 87.7                          | 96.6                                                                | 75.6 | 21.0  |
| 6              | .802                                            | .964                                                         | .676    | .288    | 84.7                          | 93.8                                                                | 74.6 | 19.2  |
| 7              | .822                                            | .975                                                         | .700    | .275    | 81.7                          | 88.6                                                                | 73.4 | 15.2  |
| 8              | .839                                            | .964                                                         | .754    | .210    | 80.1                          | 86.0                                                                | 71.6 | 14.4  |
| 9              | .854                                            | .974                                                         | .756    | .218    | 78.7                          | 83.2                                                                | 71.6 | 11.6  |
| 10             | .860                                            | .972                                                         | .785    | .187    | 77.8                          | 81.8                                                                | 72.6 | 9.2   |
| 11             | .852                                            | .968                                                         | .790    | .178    | 77.5                          | 81.0                                                                | 72.0 | 9.0   |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the Observations made at the several hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March, 1861.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Hour.          | Mean Wet Bulb Ther-<br>moneter. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force<br>of Vapour. | Mean Weight of Va-<br>pour in a Cubic<br>foot of Air. | Additional Weight of<br>Vapour required<br>for complete satu-<br>ration. | Mean degree of Hu-<br>midity, complete<br>saturation being<br>unity. |
|----------------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------|
|                | o                               | o                   | o                   | o                            | Inches.                          | Troy grs.                                             | Troy grs.                                                                |                                                                      |
| Mid-<br>night. | 72.4                            | 3.8                 | 70.5                | 5.7                          | 0.739                            | 8.03                                                  | 1.63                                                                     | 0.83                                                                 |
| 1              | 72.3                            | 3.4                 | 70.6                | 5.1                          | .741                             | .07                                                   | .44                                                                      | .85                                                                  |
| 2              | 72.0                            | 3.2                 | 70.4                | 4.8                          | .736                             | .02                                                   | .35                                                                      | .86                                                                  |
| 3              | 71.8                            | 2.7                 | 70.4                | 4.1                          | .736                             | .04                                                   | .14                                                                      | .88                                                                  |
| 4              | 71.0                            | 2.7                 | 69.6                | 4.1                          | .717                             | 7.84                                                  | .12                                                                      | .88                                                                  |
| 5              | 71.0                            | 2.7                 | 69.6                | 4.1                          | .717                             | .84                                                   | .12                                                                      | .88                                                                  |
| 6              | 70.2                            | 2.9                 | 68.7                | 4.4                          | .697                             | .63                                                   | .16                                                                      | .87                                                                  |
| 7              | 70.4                            | 3.0                 | 68.9                | 4.5                          | .701                             | .66                                                   | .21                                                                      | .86                                                                  |
| 8              | 71.7                            | 5.1                 | 69.1                | 7.7                          | .706                             | .66                                                   | 2.17                                                                     | .78                                                                  |
| 9              | 72.4                            | 7.5                 | 68.6                | 11.3                         | .695                             | .50                                                   | 3.28                                                                     | .70                                                                  |
| 10             | 73.0                            | 9.7                 | 68.1                | 14.6                         | .684                             | .32                                                   | 4.40                                                                     | .63                                                                  |
| 11             | 73.9                            | 11.6                | 68.1                | 17.4                         | .684                             | .29                                                   | 5.43                                                                     | .57                                                                  |
| Noon.          | 74.2                            | 13.6                | 67.4                | 20.4                         | .668                             | .09                                                   | 6.51                                                                     | .52                                                                  |
| 1              | 74.4                            | 15.2                | 66.8                | 22.8                         | .655                             | 6.93                                                  | 7.40                                                                     | .48                                                                  |
| 2              | 74.4                            | 16.0                | 66.4                | 24.0                         | .646                             | .83                                                   | .84                                                                      | .47                                                                  |
| 3              | 74.2                            | 16.1                | 66.1                | 24.2                         | .640                             | .76                                                   | .87                                                                      | .46                                                                  |
| 4              | 73.5                            | 16.1                | 65.4                | 24.2                         | .626                             | .62                                                   | .71                                                                      | .46                                                                  |
| 5              | 74.0                            | 13.7                | 67.1                | 20.6                         | .661                             | 7.01                                                  | 6.55                                                                     | .52                                                                  |
| 6              | 73.9                            | 10.8                | 68.5                | 16.2                         | .692                             | .41                                                   | 5.01                                                                     | .60                                                                  |
| 7              | 73.3                            | 8.4                 | 69.1                | 12.6                         | .706                             | .58                                                   | 3.79                                                                     | .67                                                                  |
| 8              | 73.2                            | 6.9                 | 69.7                | 10.4                         | .720                             | .77                                                   | .07                                                                      | .72                                                                  |
| 9              | 72.7                            | 6.0                 | 69.7                | 9.0                          | .720                             | .79                                                   | 2.62                                                                     | .75                                                                  |
| 10             | 72.5                            | 5.3                 | 69.8                | 8.0                          | .722                             | .82                                                   | .31                                                                      | .77                                                                  |
| 11             | 73.0                            | 4.5                 | 70.7                | 6.8                          | .744                             | 8.07                                                  | 1.97                                                                     | .80                                                                  |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March, 1861.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                             |
|-------|-----------------------|---------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------|
|       | 0                     | Inches.                         |                                   |                                                                                                        |
| 1     | 148.0                 | ...                             | S. W. & S.                        | Cloudless.                                                                                             |
| 2     | 142.4                 | ...                             | E. & S.                           | Cloudless.                                                                                             |
| 3     | <i>Sunday.</i>        |                                 |                                   |                                                                                                        |
| 4     | 140.5                 | ...                             | S.                                | Cloudless till 5 A. M. Scatd. $\sim$ i till 10 A. M. cloudless afterwards.                             |
| 5     | 137.2                 | ...                             | S.                                | Cloudless till 5 A. M. Scatd. $\sim$ i & $\cap$ i till 7 P. M. cloudless afterwards.                   |
| 6     | 136.0                 | ...                             | S.                                | Cloudless till 6 A. M. Scatd. $\sim$ i & $\sim$ i till 6 P. M. cloudless afterwards.                   |
| 7     | 139.2                 | ...                             | S.                                | Cloudless.                                                                                             |
| 8     | 135.0                 | ...                             | E. & N.                           | Cloudless.                                                                                             |
| 9     | 138.4                 | ...                             | S. E. & N. E.                     | Cloudless till 6 A. M. Scatd. $\sim$ i & $\cap$ i afterwards; also slightly drizzling at 8 P. M.       |
| 10    | <i>Sunday.</i>        |                                 |                                   |                                                                                                        |
| 11    | 139.0                 | 0.28                            | N. & W.                           | Cloudless till 4 A. M. Scatd. $\sim$ i till 1 P. M. cloudy afterwards; also rain between 5 & 8 P. M.   |
| 12    | ...                   | ...                             | N.                                | Cloudy till 6 P. M. cloudless afterwards.                                                              |
| 13    | 138.2                 | ...                             | N. & W.                           | Cloudless till 10 A. M. Scatd. $\sim$ i till 6 P. M. cloudless afterwards.                             |
| 14    | 135.6                 | ...                             | N. & W. & S. W.                   | Cloudless till 4 P. M. Scatd. $\sim$ i & $\sim$ i till 9 P. M. cloudless afterwards.                   |
| 15    | 141.8                 | ...                             | S. W. & S. & W.                   | Cloudless.                                                                                             |
| 16    | 140.4                 | ...                             | S.                                | Cloudless till Noon. Scatd. $\cap$ i till 4 P. M. cloudless afterwards.                                |
| 17    | <i>Sunday.</i>        |                                 |                                   |                                                                                                        |
| 18    | 139.0                 | ...                             | S. & W. & N.                      | Cloudless till 6 A. M. Scatd. $\sim$ i till 5 P. M. cloudless till 9 P. M. Scatd. $\sim$ i afterwards. |
| 19    | 135.9                 | ...                             | W.                                | Cloudless till 11 A. M. cloudy afterwards.                                                             |
| 20    | ...                   | 0.60                            | S. E. & S. W.                     | Cloudy with rain between 8 & 11 A. M.                                                                  |
| 21    | 137.0                 | ...                             | S. & S. E. & S. W.                | Cloudy till 6 A. M. cloudless till 10 A. M. Scatd. $\sim$ i till 4 P. M. cloudless afterwards.         |
| 22    | ...                   | ...                             | S. & S. W.                        | Cloudy.                                                                                                |
| 23    | 134.9                 | ...                             | S. W. & S. & W.                   | Scatd. $\sim$ i & $\cap$ i.                                                                            |
| 24    | <i>Sunday.</i>        |                                 |                                   |                                                                                                        |
| 25    | 138.0                 | ...                             | S. & S. W.                        | Scatd. clouds.                                                                                         |
| 26    | 135.0                 | ...                             | S. & S. W.                        | Scatd. clouds till 4 A. M. cloudless afterwards.                                                       |
| 27    | 139.0                 | ...                             | S. W. & S. & S. E.                | Cloudless.                                                                                             |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March, 1861.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky. |
|-------|-----------------------|---------------------------------|-----------------------------------|----------------------------|
| 28    | 137.2                 | ...                             | S.                                | Cloudless.                 |
| 29    | 139.8                 | ...                             | S.                                | Cloudless.                 |
| 30    | 141.0                 | ...                             | S.                                | Cloudless.                 |
| 31    | <i>Sunday.</i>        | ...                             |                                   |                            |

∩ Cirri, ∪i Cirro strati, ∩i Cumuli, ∪i Cumulo strati, ∪i Nimbi, —i Strati, ∪i Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March, 1861.*

MONTHLY RESULTS.

|                                                                 |    |    | Inches |
|-----------------------------------------------------------------|----|----|--------|
| Mean height of the Barometer for the month,                     | .. | .. | 29.853 |
| Max. height of the Barometer, occurred at 10 A. M. on the 12th, | .. | .. | 30.090 |
| Min. height of the Barometer, occurred at 5 P. M. on the 23rd,  | .. | .. | 29.662 |
| <i>Extreme range</i> of the Barometer during the month,         | .. | .. | 0.428  |
| Mean of the daily Max. Pressures,                               | .. | .. | 29.933 |
| Ditto ditto Min. ditto,                                         | .. | .. | 29.786 |
| <i>Mean daily range</i> of the Barometer during the month,      | .. | .. | 0.147  |

---

|                                                              |    |    | °    |
|--------------------------------------------------------------|----|----|------|
| Mean Dry Bulb Thermometer for the month,                     | .. | .. | 80.8 |
| Max. Temperature occurred at 4 P. M. on the 30th,            | .. | .. | 97.8 |
| Min. Temperature occurred at 6 A. M. on the 8th,             | .. | .. | 67.8 |
| <i>Extreme range</i> of the Temperature during the month,    | .. | .. | 30.0 |
| Mean of the daily Max. Temperature,                          | .. | .. | 91.2 |
| Ditto ditto Min. ditto,                                      | .. | .. | 72.8 |
| <i>Mean daily range</i> of the Temperature during the month, | .. | .. | 18.4 |

---

|                                                            |    |    | °      |
|------------------------------------------------------------|----|----|--------|
| Mean Wet Bulb Thermometer for the month,                   | .. | .. | 72.7   |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, | .. | .. | 8.1    |
| Computed Mean Dew-point for the month,                     | .. | .. | 68.6   |
| Mean Dry Bulb Thermometer above computed Mean Dew-point,   | .. | .. | 12.2   |
|                                                            |    |    | Inches |
| Mean Elastic force of Vapour for the month,                | .. | .. | 0.695  |

---

|                                                                         |    |    | Troy grains. |
|-------------------------------------------------------------------------|----|----|--------------|
| Mean Weight of Vapour for the month,                                    | .. | .. | 7.49         |
| Additional Weight of Vapour required for complete saturation,           | .. | .. | 3.58         |
| Mean degree of humidity for the month, complete saturation being unity, | .. | .. | 0.68         |

---

|                                                   |    |    | Inches     |
|---------------------------------------------------|----|----|------------|
| Rained 3 days, Max. fall of rain during 24 hours, | .. | .. | 0.60       |
| Total amount of rain during the month,            | .. | .. | 0.88       |
| Prevailing direction of the Wind,                 | .. | .. | S. & S. W. |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March, 1861.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind  
blew, together with the number of days on which at the same hour,  
when any particular wind was blowing, it rained.

| Hour.     | N.           | Rain on.<br>N. E. | Rain on.<br>E. | Rain on.<br>S. E. | S. | Rain on.<br>S. W. | Rain on.<br>W. | Rain on.<br>N. W. | Rain on.<br>Calm. | Rain on. | Missed. |
|-----------|--------------|-------------------|----------------|-------------------|----|-------------------|----------------|-------------------|-------------------|----------|---------|
|           | No. of days. |                   |                |                   |    |                   |                |                   |                   |          |         |
| Midnight. | 3            | 1                 |                | 3                 | 10 | 4                 | 2              |                   | 1                 | 2        |         |
| 1         | 3            | 1                 |                | 3                 | 12 | 4                 | 2              |                   | 1                 |          |         |
| 2         | 3            | 1                 |                | 3                 | 12 | 4                 | 2              |                   | 1                 |          |         |
| 3         | 3            |                   |                | 3                 | 12 | 2                 | 2              |                   | 1                 | 3        |         |
| 4         | 2            |                   |                | 2                 | 11 | 4                 | 2              |                   |                   | 5        |         |
| 5         | 3            |                   |                | 3                 | 13 | 3                 | 3              |                   |                   | 1        |         |
| 6         | 3            |                   |                | 1                 | 15 | 4                 | 3              |                   |                   |          |         |
| 7         | 3            |                   |                | 1                 | 14 | 4                 | 4              |                   |                   |          |         |
| 8         | 2            | 1                 | 2              | 1                 | 9  | 8                 | 3              | 1                 |                   |          |         |
| 9         | 3            | 2                 | 1              |                   | 9  | 8                 | 2              | 1                 | 1                 |          |         |
| 10        | 3            | 2                 |                |                   | 10 | 8                 | 2              | 1                 | 1                 |          |         |
| 11        | 1            | 1                 |                | 1                 | 10 | 6                 | 3              | 1                 | 4                 |          |         |
| Noon.     | 1            |                   | 2              |                   | 6  | 8                 | 7              | 2                 |                   |          |         |
| 1         | 1            |                   | 2              |                   | 4  | 10                | 8              | 1                 |                   |          |         |
| 2         | 3            | 2                 | 1              |                   | 4  | 9                 | 6              | 1                 |                   |          |         |
| 3         | 2            | 2                 | 1              |                   | 9  | 3                 | 8              | 1                 |                   |          |         |
| 4         | 1            | 2                 | 1              | 1                 | 6  | 4                 | 8              | 3                 |                   |          |         |
| 5         | 3            | 1                 | 1              | 1                 | 10 | 6                 | 4              |                   |                   |          |         |
| 6         | 3            | 1                 | 1              | 2                 | 13 | 3                 | 3              |                   |                   |          |         |
| 7         | 4            | 1                 | 2              | 1                 | 13 | 2                 | 2              |                   |                   | 12       |         |
| 8         | 3            | 1                 | 1              | 1                 | 15 | 3                 | 2              |                   |                   |          |         |
| 9         | 3            | 1                 | 1              | 1                 | 15 | 3                 | 2              |                   |                   |          |         |
| 10        | 3            | 1                 | 1              | 1                 | 17 | 1                 | 2              |                   |                   |          |         |
| 11        | 1            | 1                 | 1              | 1                 | 16 | 1                 | 3              |                   |                   | 12       |         |





13843TA

LEC

11-14-02 32180

76

XL





FOR LIBRARY USE ONLY.





